Fact Book

Fiscal Year

2008

NATIONAL INSTITUTES OF HEALTH
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

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1. Abbreviated Staff Directory*

Office of the Director	Bldg.	Room	Phone	MSC** †
Director, **Elizabeth G. Nabel, M.D.**	31	5A48	496–5166	2486
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Chief of Staff, **Sheila Pohl**	31	5A48	594–5355	2486
Associate Director for Administrative Management, **Donald P. Christoferson**	31	5A48	496–2411	2490
Administrative Officer, **Rebecca Ellett-Tenner**	31	5A16	496–5931	2490
Associate Director for Basic Research, **Alan M. Michelson, M.D., Ph.D.**	31	5A48	594–5353	2490
Associate Director for Biomedical Informatics, **Stephan P. Bour, Ph.D.**	RKL1‡	6100	435–0119	7994
Associate Director for Minority Health, **Helena O. Mishoe, Ph.D., M.P.H.**	RKL2§	9093C	451–5081	7913
Associate Director for Prevention, Education, and Control, **Gregory J. Morosco, Ph.D., M.P.H.**	31	4A10	496–5437	2480
Associate Director for Scientific Program Operation, **Carl A. Roth, Ph.D., LL.M.**	31	5A07	496–6331	2482
Deputy Ethics Counselor, **Nancy O'Hanlon, J.D.**	31	5A33	496–6471	2486
Office of Clinical Research				
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Senior Advisor to the Director				
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Center for Population Studies				
Director, **Daniel Levy, M.D.**	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508–935–3458			
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Deputy Director, **Vacant**	RKL1	6102	435–0119	7994
Administrative Officer, **Kathleen D. Rechen**	RKL2	8095	435–6373	7921
Applications Development and Support Branch				
Acting Chief, **Zeyad Mobassaleh**	RKL1	6104	435–0119	7994
Information Technology Resources Branch				
Chief, **Christopher E. Olaes**	RKL1	6212	435–0119	7994

* Current as of October 31, 2008. For locating personnel not listed, the general information number is 301–496–4000. All listed phone numbers are in area code 301. The Personnel Directory, which is periodically updated throughout the year, is located on the NHLBI Home Page under About NHLBI.

** MSC—Mail Stop Code.

† Full mailing address formats are located at the end of this chapter.

‡ RKL1—Rockledge I Building.

§ RKL2—Rockledge II Building.

Office of the Director (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Planning, Architecture, Communication and Evaluation Branch				
Acting Chief, **Christopher E. Olaes**	RKL1	6212	435–0119	7994
Ethics Office				
Director, **Nancy O'Hanlon, J.D.**	31	5A33	496–6471	2486
Ethics Coordinator, **Kim Y. Brinson**	31	5A33	496–6471	2486
Ethics Coordinator, **Hedy S. Tam**	31	5A33	496–6471	2486
Office of Administrative Management				
Director/Executive Officer, **Donald P. Christoferson**	31	5A48	496–2411	2490
Deputy Executive Officer, **Timothy J. Wheeles**	31	5A48	496–2411	2490
Administrative Officer, **Rebecca Ellett-Tener**	31	5A16	496–5931	2490
Office of Freedom of Information and Privacy				
Director, **Suzanne A. Freeman**	RKL1	6070	496–9737	7957
Management Policy and Administrative Services Branch				
Chief, **Marilyn G. Jackson**	31	5A16	496–5931	2490
Financial Management Branch				
Chief, **Sandra L. Gault**	31	5A34	496–4653	2490
Extramural Administrative Management Branch				
Chief, **Loretta L. Usilton**	RKL2	8095	435–6373	7921
Intramural Administrative Management Branch				
Chief, **Gary Unger**	10	7N220	451–0892	1670
Office of Workforce Management				
Director, **Gwen G. Platt**	RKL1	6070	496–1763	7957
Office of Clinical Research				
Director, **Maria R. Stagnitto, M.S.N.**	RKL2	9093B	435–7594	7913
Office of Research Training and Minority Health				
Director, **Helena O. Mishoe, Ph.D., M.P.H.**	RKL2	9093C	451–5081	7913
Deputy Director, **Chitra Krishnamurti, Ph.D.**	RKL2	9093C	451–5081	7913
Administrative Officer, **James McKenzie**	RKL2	8095	435–6373	7921
Office of Science and Technology				
Director, **Carl A. Roth, Ph.D., LL.M.**	31	5A07	496–6331	2482
Deputy Director, **Barbara Marzetta, M.S.**	31	5A07	496–9899	2482
Administrative Officer, **Rebecca Ellett-Tenner**	31	5A16	496–5931	2490
Program Studies and Reports Program				
Director, **Carl A. Roth, Ph.D., LL.M.**	31	5A07	496–6331	2482
Science and Special Issues Program				
Director, **Barbara Marzetta, M.S.**	31	5A07	496–9899	2482
Office of Legislative Liaison				
Director, **Stephanie Y. Burrows, Ph.D.**	31	5A07	496–9899	2482
Office of Public Liaison				
Coordinator, **Hilary S. Leeds, J.D.**	31	5A07	594–9869	2482
Office of Technology Transfer and Development				
Director, **Alan H. Deutch**	RKL1	6018	402–5579	7992
Administrative Officer, **Kathleen Rechen**	RKL2	8095	435–6373	7921
Division of Cardiovascular Diseases				
Office of the Director				
Senior Advisor to the Director, **Marvin A. Konstam, M.D.**	RKL2	8128	435–0466	7940
Acting Director, **Sonia I. Skarlatos, Ph.D.**	RKL2	8124	435–0466	7940

Division of Cardiovascular Diseases (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Acting Deputy Director, **Susan E. Old, Ph.D.**	RKL2	8132	435–0477	7940
Administrative Officer, **Lisa A. Freeny**	RKL2	8095	435–6373	7921
Special Assistant for Clinical Studies, **David J. Gordon, M.D., Ph.D.**	RKL2	8134	435–0466	7940
Office of Research Training and Career Development Director, **Jane Scott, Sc.D.**	RKL2	8138	435–0535	7940
Advanced Technologies and Surgery Branch Chief, **Denis B. Buxton, Ph.D.**	RKL2	8216	435–0504	7940
Atherothrombosis and Coronary Artery Disease Branch Chief, **Michael J. Domanski, M.D.**	RKL2	8146	435–0550	7940
Heart Developmental and Structural Diseases Branch Chief, **Gail D. Pearson, M.D., Sc.D.**	RKL2	8104	435–0510	7940
Heart Failure and Arrhythmias Branch Chief, **Alice M. Mascette, M.D.**	RKL2	8170	435–0504	7940
Vascular Biology and Hypertension Branch Acting Chief, **Eser E. Tolunay, Ph.D.**	RKL2	8120	435–0560	7940
Division of Lung Diseases				
Office of the Director				
Director, **James P. Kiley, Ph.D.**	RKL2	10042	435–0233	7952
Deputy Director, **Gail G. Weinmann, M.D.**	RKL2	10042	435–0233	7952
Administrative Officer, **Amy W. Sheetz**	RKL2	8095	435–6373	7921
Research Training and Special Programs Leader, **Sandra Colombini Hatch, M.D.**	RLK2	10042	435–0222	7952
Leader, **Ann E. Rothgeb**	RLK2	10042	435–0202	7952
Airway Biology and Disease Branch Chief, **Thomas L. Croxton, M.D., Ph.D.**	RKL2	10042	435–0202	7952
Lung Biology and Disease Branch Chief, **Dorothy B. Gail, Ph.D.**	RKL2	10042	435–0222	7952
National Center on Sleep Disorders Research Director, **Michael J. Twery, Ph.D.**	RKL2	10042	435–0199	7952
Division of Blood Diseases and Resources				
Office of the Director				
Acting Director, **Susan B. Shurin, M.D.**	31	5A48	496–1078	2486
Acting Deputy Director, **George J. Nemo, Ph.D.**	RKL2	9144	435–0080	7950
Administrative Officer, **Amy W. Sheetz**	RKL2	8095	435–6373	7921
Research Training and Career Development Leader, **Traci H. Mondoro, Ph.D.**	RKL2	9140	435–0065	7950
Leader, **Rita Sarkar, Ph.D.**	RKL2	9161	435–0070	7950
Leader, **Ellen M. Werner, Ph.D.**	RKL2	9162	435–0050	7950
Leader, **Henry Chang, M.D.**	RKL2	9176	435–0080	7950
Blood Diseases Branch Acting Chief, **Harvey S. Luksenburg, M.D.**	RKL2	9164	435–0050	7950
Thrombosis and Hemostasis Branch Acting Chief, **Rebecca P. Link, Ph.D.**	RKL2	9168	435–0070	7950
Transfusion Medicine and Cellular Therapeutics Branch Chief, **Simone A. Glynn, M.D.**	RKL2	9142	435–0065	7950

Division of Prevention and Population Sciences	**Bldg.**	**Room**	**Phone**	**MSC**
Office of the Director				
Director, **Michael S. Lauer, M.D.**	RKL2	10018	435–0422	7936
Deputy Director, **Diane E. Bild, M.D., M.P.H.**	RKL2	10018	435–0422	7936
Senior Scientific Advisor, **Denise Simons-Morton, M.D., Ph.D.**	RKL2	10018	435–0384	7936
Administrative Officer, **Stacey A. Long**	RKL2	8095	435–6373	7921
Office of Biostatistics Research				
Director, **Nancy L. Geller, Ph.D.**	RLK2	9093A	435–0434	7913
Research Training and Special Programs				
Leader, **Charlotte A. Pratt, Ph.D.**	RLK2	10018	435–0382	7936
Leader, **Lorraine M. Silsbee**	RLK2	10018	435–0709	7936
Clinical Applications and Prevention Branch				
Chief, **Lawrence J. Fine, M.D.**	RKL2	10018	435–0305	7936
Deputy Chief, **Peter G. Kaufmann, Ph.D.**	RKL2	10018	435–2467	7936
Epidemiology Branch				
Chief, **Paul D. Sorlie, Ph.D.**	RKL2	10018	435–0707	7936
Deputy Chief, **Jean L. Olson, M.D., M.P.H.**	RKL2	10018	435–0707	7936
Deputy Chief, **Richard R. Fabsitz, Ph.D.**	RKL2	10018	435–0707	7936
Scientific Advisor, **Phyliss D. Sholinsky, M.S.P.H.**	RKL2	10018	435–0707	7936
Women's Health Initiative Branch				
Director, **Elizabeth G. Nabel, M.D.**	31	5A48	496–5166	2486
Chief, **Jacques E. Rossouw, Ph.D.**	RKL2	10018	402–2900	7936
Deputy Chief, **Shari E. Ludlam, M.P.H.**	RKL2	10018	402–2900	7936
Division for the Application of Research Discoveries				
Director, **Gregory J. Morosco, Ph.D., M.P.H.**	31	4A10	496–5437	2480
Administrative Officer, **Rebecca Ellett-Tener**	31	5A16	496–5931	2490
Program Operations				
Senior Manager, **Nancy J. Poole, M.B.A.**	31	4A10	496–5437	2480
Enhanced Dissemination and Utilization Branch				
Chief, **Rob Fulwood, Ph.D., M.S.P.H.**	31	4A10	496–0554	2480
Health Communications and Social Marketing Branch				
Acting Chief, **Diane E. Striar**	31	4A10	496–0554	2480
Research Translation Branch				
Acting Chief, **Gregory J. Morosco, Ph.D., M.P.H.**	31	4A10	496–5437	2480
Division of Extramural Research Activities				
Office of the Director				
Director, **Stephen C. Mockrin, Ph.D.**	RKL2	7100	435–0260	7922
Deputy Director, **Vacant**	RKL2	7104	435–0260	7922
Chief of Staff, **Janet George**	RKL2	7220	435–0260	7922
Administrative Officer, **Veronica M. VanWagner**	RKL2	8095	435–6373	7921
Office of Acquisitions				
Director, **John C. Taylor**	RKL2	6100	435–0330	7902
Deputy Director, **Christopher J. Belt**	RKL2	6106	435–0330	7902
Special Assistant to the Director				
Debra C. Hawkins	RKL2	6224	435–0330	7902
Blood Diseases and Resources Contracts Branch				
Chief, **Joanna Magginas**	RKL2	6136	435–0360	7902

Division of Extramural Research Activities (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Cardiovascular and Lung Diseases Contracts Branch				
Chief, **Pamela S. Lew**	RKL2	6016	435–0340	7902
Prevention and Population Sciences Contracts Branch				
Chief, **Paul D. McFarlane**	RKL2	6126	435–0345	7902
Procurement Branch				
Acting Chief, **Kathleen J. Marsden**	RKL2	6140	435–0364	7902
Office of Committee Management				
Director, **Kathryn M. Valeda**	RKL2	7110	435–0255	7922
Deputy Director, **David Alperin**	RLK2	7110	435–0255	7922
Office of Extramural Policy and Review				
Director, **Paul A. Velletri, Ph.D.**	RKL2	7218	435–0569	7922
Review Branch				
Chief, **Valerie L. Prenger, Ph.D.**	RKL2	7214	435–0270	7924
Office of Grants Management				
Director, **Suzanne A. White**	RKL2	7160	435–0144	7926
Deputy Director, **Raymond L. Zimmerman**	RKL2	7130	435–0144	7926
Blood Diseases and Resources Grants Management Branch				
Chief, **Robert Vinson, Jr.**	RKL2	7156	435–0166	7926
Cardiovascular Diseases Grants Management Branch				
Chief, **David L. Reiter**	RKL2	7172	435–0177	7926
Lung Diseases Grants Management Branch				
Chief, **Ryan C. Lombardi**	RKL2	7154	435–0166	7926
Prevention and Population Sciences Grants Management Branch				
Chief, **Teresa F. Marquette**	RKL2	7128	435–0177	7926
Office of Strategic and Innovative Programs				
Director, **Robert A. Musson, Ph.D.**	RKL2	7106	435–0266	7922
Deputy Director, **Rachel Permuth-Levine**	RKL2	7210	435–0260	7922
Division of Intramural Research				
Office of the Director				
Scientific Director, **Robert S. Balaban, Ph.D.**	10CRC*	4-1581	496–2116	1458
Intramural Administrative Management Branch				
Chief, **Gary Unger**	10	7N214	451–0892	1686
Office of Education				
Chief, **Herbert M. Geller, Ph.D.**	10	2N242	451–9440	1754
Laboratory of Animal Medicine and Surgery				
Chief, **Robert F. Hoyt, D.V.M.**	14E	105B	496–9673	5570
Office of the Clinical Director				
Director, **Richard O. Cannon III, M.D.**	10CRC	5-3330	496–9895	1454
Office of Clinical Affairs				
Chief, **Melissa B. Bryant**	10CRC	6-5140	594–8375	1608
Cardiothoracic Surgery				
Chief, **Keith A. Horvath**	10	2N246	451–7098	1454

* 10CRC—Building 10 Clinical Research Center.

Division of Intramural Research (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Hematology Branch				
Chief, **Neal S. Young, M.D.**	10CRC	3-5140	496–5093	1202
FACs Core				
Head, **J. Philip McCoy, Ph.D.**	10	8C104	451–8824	1357
Pulmonary and Vascular Medicine Branch				
Acting Chief, **Stewart J. Levine, M.D.**	10CRC	5-5142	435–2310	1476
Genomics Core				
Head, **Nalini Raghavachari, Ph.D.**	10	8C103B	435–2304	1754
Translational Medicine Branch				
Chief, **Toren Finkel, M.D., Ph.D.**	10CRC	5-3330	402–4081	1454
Deputy Chief, **Joel Moss, M.D., Ph.D.**	10	6D03	496–1597	1590
Animal MRI/Imaging Core				
Head, **Stasia Anderson, Ph.D.**	10	2N240	401–0908	1518
Catheter Fabrication Core				
Chief, **Ozgur Kocaturk**	10	BID416	496–4666	1061
Biochemistry and Biophysics Center				
Director, **Nico Tjandra, Ph.D.**	50	2134	496–2073	8012
Cell Biology and Physiology Center				
Director, **Edward D. Korn, Ph.D.**	50	2517	496–1616	8017
Light Microscopy Core				
Head, **Christian Combs, Ph.D.**	10	6N309	496–3236	1623
Lipid Trafficking Core				
Head, **Edward Neufeld, Ph.D.**	10	5N107	496–5879	1424
Proteomics Core				
Head, **Rong-Fong Shen, Ph.D.**	10	8C1036	594–1060	1597
Genetics and Development Biology Center				
Director, **Cecilia Lo, Ph.D.**	10	6C103A	451–8041	1583
Electron Microscopy Core				
Head, **Mathew Daniels, Ph.D.**	50	3318	496–2898	8017
Pathology Core				
Head, **Zu-Xi Yu, Ph.D.**	10	2N240	496–5035	1518
Transgenic Core				
Head, **Chengyu Liu, Ph.D.**	50	3305	435–5034	8018
Immunology Center				
Director, **Warren Leonard, M.D.**	10	5B07	496–0098	1674

NIH Mailing Address Formats

NHLBI staff e-mail addresses can be found by using the NIH Directory and E-mail Forwarding Service located on the Internet at http://directory.nih.gov.

Please use the following formats for NIH mailing addresses:

Building 10	Full Name NHLBI, NIH Building 10, Room ____ 10 Center Drive MSC* ____ Bethesda, MD 20892–MSC**
Building 31	Full Name NHLBI, NIH Building 31, Room ____ 31 Center Drive MSC* ____ Bethesda, MD 20892–MSC**
Building 50	Full Name NHLBI, NIH Building 50, Room ____ 50 South Drive MSC* Bethesda, MD 20892–MSC**
Rockledge II Building	Full Name NHLBI, NIH Two Rockledge Center, Room ____ 6701 Rockledge Drive MSC* ____ Bethesda, MD 20817–MSC**
Rockledge I Building	Full Name NHLBI, NIH One Rockledge Center, Room ____ 6705 Rockledge Drive MSC* ____ Bethesda, MD 20817–MSC**

* Retain the letters MSC before adding the mail stop code number.
** Replace the letters MSC with the mail stop code number.

2. Program Overview

The National Heart Institute (NHI) was established in 1948 through the National Heart Act with a mission to support research and training in the prevention, diagnosis, and treatment of cardiovascular diseases (CVD). Twenty-four years later, through section 413 of the National Heart, Blood Vessel, Lung, and Blood Act (P.L. 92-423), Congress mandated the Institute to expand and coordinate its activities in an accelerated attack against heart, blood vessel, lung, and blood diseases. The renamed National Heart, Lung, and Blood Institute (NHLBI) expanded its scientific areas of interest and intensified its efforts related to research on diseases within its purview. Over the years, the Institute's areas of interest have grown to encompass genetic, genomic, and proteomic research, systems biology, sleep disorders, and the Women's Health Initiative (WHI).

The mission of the NHLBI is to provide leadership for a national program in diseases of the heart, blood vessels, lung, and blood; sleep disorders; and blood resources management. The Institute:

- Plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases and sleep disorders conducted in its own laboratories and by other scientific institutions and individuals supported by research grants and contracts.
- Plans and directs research in development and evaluation of interventions and devices related to the prevention of heart, lung, and blood diseases and sleep disorders and the treatment and rehabilitation of patients who suffer from them.
- Conducts research on the clinical use of blood and all aspects of the management of blood resources.
- Supports career training and development of new and established researchers in fundamental sciences and clinical disciplines to enable them to conduct basic and clinical research related to heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources through individual and institutional research training awards and career development awards.
- Coordinates relevant activities with other research institutes and all Federal health programs in the above areas, including the causes of stroke.
- Conducts educational activities, including development and dissemination of materials for health professionals and the public in the above areas, with emphasis on prevention.
- Maintains continuing relationships with institutions and professional associations, and with international, national, state, and local officials, as well as voluntary agencies and organizations working in the above areas.
- Oversees management of the WHI.

Each year, the NHLBI assesses progress in the scientific areas for which it is responsible and updates its goals and objectives. As new opportunities are identified, the Institute expands and revises its areas of interest. Throughout the process, the approach used by the Institute is an orderly sequence of research activities that includes:

- Acquisition of knowledge
- Evaluation of knowledge
- Application of knowledge
- Dissemination of knowledge.

NHLBI Programs

The programs of the NHLBI, as shown on page 10, are implemented through five extramural units:

- Division of Cardiovascular Diseases (DCVD)
- Division of Lung Diseases (DLD)
- Division of Blood Diseases and Resources (DBDR)

Programs Supported by the National Heart, Lung, and Blood Institute

Cardiovascular Diseases

Advanced Technologies and Surgery
Diagnostics Development
Emerging Therapeutics
Enabling Technologies
Surgery Advances

Atherothrombosis and Coronary Artery Disease
Acute and Chronic Coronary Syndromes
Acute and Silent Ischemia
Angina
Atherothrombosis
Coronary Artery Disease
Myocardial Infarction
Revascularization

Heart Developmental and Structural Disease
Adult Congenital Disease
Cardiac Immunology and Infection
Cardiovascular Development
Heart Transplantation
Pediatric Cardiovascular Disease
Valvular Heart Disease

Heart Failure and Arrhythmias
Arrhythmias
Heart Failure
Myocardial Protection
Resuscitation
Sudden Cardiac Death

Vascular Biology and Hypertension
Aneurysms
Cerebrovascular Disease
Hypertension
Lymphatic Diseases
Peripheral Vascular Disease
Renal Vascular Disease
Vascular Biology
Vascular Development and Angiogenesis

Lung Diseases

Airway Biology and Disease
Asthma
Chronic Obstructive Pulmonary Disease (COPD) and Environmental Lung Diseases
Cystic Fibrosis (CF)
Genetics, Genomics, and Biotechnology

Lung Biology and Disease
Acquired Immunodeficiency Syndrome (AIDS) and Tuberculosis (TB)
Critical Care and Acute Lung Injury
Developmental Biology and Pediatric Lung Disease
Immunology and Fibrosis
Lung Cell and Vascular Biology

National Center on Sleep Disorders Research
Sleep Disorders and Related Conditions
Ventilatory Control

Blood Diseases and Resources

Blood Diseases
Anemias
Erythropoiesis
Malaria
Red Cells
Sickle Cell Disease (SCD)
Thalassemia

Thrombosis and Hemostasis
Hematologic Immune Disorders
Hemophilia and Other Bleeding Disorders
Hemostasis
Immunity and Inflammation
Thrombosis

Transfusion Medicine and Cellular Therapeutics
Hematopoietic Stem Cell Transplantation
Immune Deficiencies, Reconstitution, Response, and Tolerance
Myelodysplasia, Marrow Failure, and Myeloproliferative Disorders
Novel Cellular Therapies for Repair and Regeneration
Stem Cell Biology
Transfusion Medicine Use, Safety, and Availability of Blood and Blood Components

Prevention and Population Sciences

Clinical Applications and Prevention
Behavioral Medicine Prevention of Cardiovascular Disorders
Obesity Health Outcomes

Epidemiology
Analytical Resources
Field Studies and Clinical Epidemiology
Genetic Epidemiology

Women's Health Initiative
Hormone Therapy Trial
Dietary Modification Trial
Calcium and Vitamin D Trial
Observational Study
Memory Study

Application of Research Discoveries

Research Translation Branch
Research Translation
Research Opportunities Identification
Clinical Guidelines
Clinical Support and Implementation Applications
Knowledge Exchange Networks

Enhanced Dissemination and Utilization Branch
Research Dissemination
Research Utilization
Data Analysis and Evaluation
Health Communications and Social Marketing Branch

Health Communication Strategies
Social Marketing
Media Relations
NHLBI Health Information Center

Intramural Research

Clinical Research
Cardiothoracic Surgery
Hematology
Pulmonary and Vascular Medicine
Translational Medicine

Laboratory Research
Biochemistry and Biophysics
Cell Biology and Physiology
Genetics and Development Biology
Immunology

- Division of Prevention and Population Sciences (DPPS)
- Division for the Application of Research Discoveries (DARD)

and one intramural unit:

- Division of Intramural Research (DIR).

The extramural divisions use a variety of funding mechanisms, such as individual research project grants, cooperative agreements, program project grants, Small Business Innovation Research (SBIR) grants, Small Business Technology Transfer (STTR) grants, Specialized Centers of Clinically Oriented Research (SCCOR) grants, comprehensive center grants, contracts, and research training and career development programs.

Descriptions of the Divisions follow.

Division of Cardiovascular Diseases

The DCVD supports research on the causes, diagnosis, prevention, and treatment of CVD through an integrated program of basic and clinical research, including translational research, networks, and multicenter clinical trials. Research funded by the Division is allocated among investigator- and Institute-initiated grants and contracts in disease areas such as atherothrombosis, coronary artery disease, myocardial infarction and ischemia, heart failure, arrhythmia, sudden cardiac death, adult and pediatric congenital heart disease, cardiovascular complications of diabetes and obesity, and hypertension. The DCVD fosters biotechnological research in genomics, proteomics, nanotechnology, imaging, device development, cell- and tissue-based therapeutics, gene therapy, and the development of advanced technologies, including technologies for surgery. SCCORs support clinical collaborative research in cardiac dysfunction and disease; pediatric heart development and disease; and vascular injury, repair, and remodeling.

The Division is organized into the five Branches and one Office described below.

Advanced Technologies and Surgery Branch

The Advanced Technologies and Surgery Branch supports integrated basic and clinical research to develop technologies for the diagnosis, prevention, and treatment of CVD. Research on diagnostics focuses on proteomic, genomic, and other biomarker technologies and on imaging modalities and agents. Therapeutics research focuses on tissue-, cell-, and gene-based therapies; regenerative and reparative medicine; image-guided therapies; and cardiac and circulatory support and repair devices. Research related to surgery addresses improved surgical and image-guided therapies and the translation of cardiovascular surgical advances into clinical practice. Enabling technologies research includes bioinformatics, computational and systems biology, bioengineering, nanotechnology, materials research, and personalized medicine.

Atherothrombosis and Coronary Artery Disease Branch

The Atherothrombosis and Coronary Artery Disease Branch supports integrated basic and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of coronary artery disease and atherothrombosis. Research on coronary artery disease focuses on acute and chronic coronary syndromes, including myocardial infarction; acute ischemia, angina, and silent ischemia; and percutaneous and surgical revascularization of stenotic and restenotic coronary lesions. Atherothrombosis research investigates atherosclerotic lesions in coronary arteries and other arterial beds; lipid fractions and interactions with the arterial wall; lesion instability, vulnerable plaques, and thrombosis; and biomarker and imaging diagnostics to quantify plaque and atherosclerosis progression. Atherothrombosis research also includes studies of diet, exercise, diabetes, obesity, and other metabolic conditions related to atherothrombosis.

Heart Development and Structural Diseases Branch

The Heart Development and Structural Diseases Branch supports integrated basic and clinical research on normal and abnormal cardiovascular development and the etiology, pathogenesis, prevention, diagnosis, and treatment of pediatric and adult structural heart disease. Research areas in heart development include normal and abnormal development, molecular and genetic etiology of cardiovascular malformations, cardiomyogenic differentiation of stem cells, and gene–environment interactions in the development of congenital heart disease. Structural disease research includes the investigation of congenital heart disease, from embryology through adulthood, and the associated exercise physiology and

neurodevelopmental outcomes; valve disease; pediatric cardiomyopathy and heart transplantation; and pediatric cardiac inflammation and infection.

Heart Failure and Arrhythmias Branch

The Heart Failure and Arrhythmias Branch supports integrated basic and clinical research on normal and abnormal cardiac function to improve diagnosis, treatment, and prevention of heart failure and arrhythmias and to protect the myocardium and manage resuscitation. Heart failure research addresses the pathogenesis and treatment of heart failure and cardiomyopathies, including the use of devices, medical treatments, and cell-based therapies. Arrhythmias research investigates the etiology of rare and common arrhythmias, sudden cardiac death, and arrhythmogenesis and explores the genetic and environmental bases of normal cardiac electrical activity. Myocardium protection research focuses on stunning and hibernation, ischemic/reperfusion injury, and preconditioning. Resuscitation research includes the study of whole-body oxygen deprivation; organ preservation; and cell, tissue, and organ protection during cardiac arrest and traumatic shock.

Vascular Biology and Hypertension Branch

The Vascular Biology and Hypertension Branch supports integrated basic and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of hypertension and vascular diseases. Vascular biology focuses on the biology of the vascular wall and its role in hypertension; cerebrovascular, renal, lymphatic, aneurysmal, and peripheral vascular disease; the development of arteries, veins, lymphatics, and microcirculation; and angiogenesis. Hypertension research includes the study of blood pressure regulation including central, renal, and vascular control, and cerebrovascular disease resulting from high blood pressure.

Office of Research Training and Career Development

The Office of Research Training and Career Development provides opportunities for people at a variety of educational levels, from high school students to academic faculty, to pursue and build careers in cardiovascular research. It collaborates with the scientific community and professional organizations to ensure that its programs meet the needs of young scientists from diverse backgrounds. Activities include institutional and individual research training programs and fellowships, diversity supplements to provide mentored experiences with established research scientists, the Pathway to Independence Program that allows recipients to bridge the gap between a career development award and a research award, and career development programs designed for clinical research.

Division of Lung Diseases

The DLD supports research on the causes, diagnosis, treatment, and prevention of lung diseases and sleep disorders. Research is funded through investigator- and Institute-initiated grants and contracts in disease areas such as asthma, bronchopulmonary dysplasia, COPD, CF, sleep-disordered breathing, critical care and acute lung injury, developmental biology and pediatric pulmonary diseases, immunologic and fibrotic pulmonary disease, rare lung disorders, pulmonary vascular disease, and pulmonary complications of AIDS and tuberculosis. SCCORs support collaborative studies on COPD, pulmonary vascular disease, and host factors in chronic lung diseases.

The Division also supports demonstration and dissemination projects to transfer basic research and clinical findings to health care professionals and patients, and training and career development programs for individuals interested in furthering their professional abilities in lung diseases research. The DLD, through the National Center on Sleep Disorders Research, coordinates sleep research activities across the NIH, other Federal Agencies, and outside organizations.

The Division is organized into the three Branches described below.

Airway Biology and Disease Branch

The Airway Biology and Disease Branch supports basic and clinical research and research training in asthma, COPD, CF, and airway function in health and disease. The Branch supports innovative genetics, genomics, and biotechnology programs to advance discovery of lung disease risk factors, mechanisms, and treatment. It also funds applied studies to develop new methods of lung imaging.

Asthma research investigates the origins, pathogenesis, and management of asthma, including the role of immunologic and nonimmunologic events and inflammation in its pathogenesis; the genetics of asthma and atopy; airway remodeling and repair in asthma; the

mechanisms of severe asthma; and the regulation of mucous hypersecretion and mucous cell metaplasia. A growing area of interest for the Branch is health education research and demonstration and education projects for the management of asthma.

Research on COPD and other diseases of the lung related to smoking or environmental exposures explores pathogenetic mechanisms involved in the development and progression of COPD, emphysema, and lung disease associated with alpha-1-antitrypsin deficiency; genetic determinants of lung disease; management of COPD; and properties and health effects of air pollution. The Branch is also interested in health education research and demonstration and education projects for COPD management.

Research on CF focuses on the function of the CF transmembrane conductance regulator and its role in lung disease. Areas of interest include airway epithelial ion transport, airway surface liquids, animal and cellular models for CF, signaling pathways in airway cells, regulation of mucin expression and secretion, development and clinical testing of treatments, and mechanisms underlying the infectious and inflammatory aspects of CF lung disease.

Lung Biology and Disease Branch

The Lung Biology and Disease Branch supports basic, translational, and clinical research, and research training programs in pulmonary conditions associated with human immunodeficiency virus (HIV)/AIDS, acute lung injury and critical care medicine, lung development and pediatric lung diseases, lung immunobiology and interstitial lung diseases, lymphangioleiomyomatosis, and lung cell and vascular biology.

AIDS and tuberculosis research focuses on the course and pulmonary manifestations of HIV infection and tuberculosis, including a collaborative effort to identify lung complications associated with HIV infection. The Branch supports the development of tuberculosis curricula for medical schools.

Research on acute lung injury and critical care medicine explores the pathogenesis, treatment, and prevention of acute lung injury and acute respiratory distress syndrome (ARDS). The Branch supports development of new diagnostic tools for detection of acute lung injury and development of an artificial lung and oversees clinical studies of therapies for ARDS, including the ARDS Network.

Research in developmental biology and pediatric pulmonary diseases investigates the regulation of lung development, growth, and repair and focuses on pediatric pulmonary diseases in infants and children, including bronchopulmonary dysplasia and persistent pulmonary hypertension of the newborn. Research also focuses on identification of lung progenitor stem cells and exploration of lung cell-based therapy.

Research on immunology and fibrosis includes studies of interstitial pulmonary fibrosis, sarcoidosis, occupational and environmental lung diseases, and the role of immune response and inflammation in these diseases. The Branch also supports research on lung immunobiology, lung transplantation, and pathogenesis of lymphangioleiomyomatosis.

Lung cell and vascular biology research investigates lung cell biology and function and pulmonary vascular disease, including pulmonary arterial hypertension and pulmonary embolism diagnosis. Research focuses on pulmonary alveolar epithelial cells, vascular endothelial cells, and the lung surfactant system. The Branch also includes research on the regulation of barrier function of pulmonary endothelial cells and regulation of lung permeability.

National Center on Sleep Disorders Research

The National Center on Sleep Disorders Research (NCSDR) supports research, health education, and research training related to sleep-disorder breathing and the fundamental function of sleep and circadian rhythms. Specific areas of interest include neurobiology of ventilatory control, respiratory rhythmogenesis, chemosensitivity, basic neurobiology of sleep–wake regulation, circadian-coupled cellular function, and effects of sleep deprivation. The NCSDR also stewards several forums, including the Sleep Disorders Research Advisory Board and the Trans-NIH Sleep Research Coordinating Committee, that facilitate the coordination of sleep research across the NIH and with other Federal Agencies and outside organizations. The Center participates in translation of new sleep research findings for dissemination to health care professionals and the public.

Division of Blood Diseases and Resources

The DBDR supports research on the causes, diagnosis, treatment, and prevention of nonmalignant blood diseases, including anemias, SCD, and thalassemia; premalignant processes such as myelodysplasia and myeloproliferative disorders; hemophilia and other abnormalities of hemostasis and thrombosis; and immune dysfunction. Funding encompasses a broad spectrum of research ranging from basic biology to medical management of blood diseases. SCCORs and other specialized centers support collaborative research in hemostatic and thrombotic diseases, transfusion biology and medicine, SCD, and cell-based therapy for blood diseases. The Division also has a major responsibility to improve the adequacy and safety of the Nation's blood supply. It has a leading role in applying scientific advances in transfusion medicine and stem cell biology to the development of new cell-based therapies to repair and regenerate human tissues and organs.

The Division is organized into the three Branches described below.

Blood Diseases Branch

The Blood Diseases Branch supports research and research training in blood diseases, including SCD, thalassemia, Fanconi anemia, Diamond-Blackfan anemia and other aplastic anemias and malaria. Additionally, it supports outcomes-related research. Research in SCD and thalassemia focuses on elucidating the etiology and pathophysiology of the diseases and improving disease treatment and management. Areas of emphasis include genetics, regulation of hemoglobin synthesis, iron chelation, development of drugs to increase fetal hemoglobin production, hematopoietic transplantation, and gene therapy. Basic and translational red cell research are also areas of interest.

Thrombosis and Hemostasis Branch

The Thrombosis and Hemostasis Branch supports research and research training in hemostasis, thrombosis, and endothelial cell biology, including basic research, clinical studies, and technology development. Areas of interest include hemophilia and von Willebrand disease as well as immune disorders such as idiopathic thrombocytopenic purpura, thrombotic thrombocytopenic purpura, and systemic lupus erythematosus. Research on bleeding disorders focuses on identifying effective treatments. Emerging areas of interest are gene transfer; clinical proteomics; inflammation and thrombosis; stroke; coagulation activation; autoimmune disease; and thrombotic complications of obesity, diabetes, and cancer. The Branch also supports research on the pathogenesis of arterial and venous thrombosis to improve the diagnosis, prevention, and treatment of thrombosis in heart attack, stroke, and peripheral vascular diseases. A major goal is to find additional platelet inhibitors, anticoagulants, and fibrinolytic agents to treat thrombotic and thromboembolic disorders with better specificity and fewer side effects than those currently used for treatment.

Transfusion Medicine and Cellular Therapeutics Branch

The Transfusion Medicine and Cellular Therapeutics Branch supports research and research training in transfusion medicine, stem cell biology and disease, hematopoiesis, clinical cellular medicine, and blood supply adequacy and safety. Research focuses on the use, safety, and availability of blood and blood components for transfusion and cellular therapies. Research areas include transmission of disease, noninfectious complications of transfusions, immunobiology, cell biology and disease, novel cell-based therapies, hematopoietic stem cell transplantation, and overall product availability. The Branch develops programs for basic and clinical research related to normal and abnormal cellular biology and pathology. It also collaborates with governmental, private sector, and international organizations to improve the safety and availability of the global supply of blood and blood components.

Division of Prevention and Population Sciences

The DPPS supports and provides leadership for population- and clinic-based research on the causes, prevention, and clinical care of cardiovascular, lung, and blood diseases and sleep disorders. Research includes a broad array of epidemiological studies to describe disease and risk factor patterns in populations and to identify risk factors for disease; clinical trials of interventions to prevent disease; studies of genetic, behavioral, sociocultural, and environmental influences on disease risk and outcomes; and studies of the application of prevention and treatment strategies to improve clinical care and public health. The Division also supports training and career development in these areas of research.

The Division is organized into the four components described below.

Clinical Applications and Prevention Branch

The Clinical Applications and Prevention Branch supports, designs, and conducts research and supports training on behavioral, environmental, clinical, and health care approaches to reduce the occurrence and consequences of CVD. Prevention research examines the effectiveness of interventions to slow or halt risk factor or disease development or progression. Interventions, many of which focus on high-risk individuals and populations, include medications, behavioral strategies, and environmental change. Studies to examine lifestyle, nutrition and exercise, psychological and sociocultural factors, and environmental and genetic influences relevant to prevention are supported. Also supported is clinical application research to examine approaches to improve health care delivery and patient outcomes. Studies include clinical and community trials and observational studies.

Epidemiology Branch

The Epidemiology Branch supports, designs, and conducts research and supports research training in the epidemiology of cardiovascular, lung, and blood diseases and sleep disorders. Studies are conducted to identify temporal trends and population patterns in the prevalence, incidence, morbidity, and mortality from the diseases and include single- and multicenter observational epidemiologic studies of development, progression, and treatment of cardiovascular, lung, and blood diseases and sleep disorders. Areas of emphasis include environmental, lifestyle, physiological, and genetic risk factors for disease and risk factor development including characterization of gene–gene and gene–environment interactions. Large cohorts consisting of minority participants such as Hispanics and blacks have been assembled to explore health disparities in minorities. The Branch also distributes data from eligible NHLBI studies to researchers through a process that adheres to guidelines for the protection of participant privacy and confidentiality.

Women's Health Initiative Branch

The Women's Health Initiative Branch in collaboration with the National Cancer Institute (NCI), the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), the National Institute on Aging (NIA), the National Institute of Neurological Disorders and Stroke (NINDS), and the Office of Research on Women's Health (ORWH), supports clinical trials and observational studies to improve the understanding of the causes and prevention of major diseases affecting the health of women. Current studies focus on CVD, cancer, and fractures. Large multicenter observational studies seek to identify risk markers for disease or better quantify known markers using questionnaires, clinical examinations, and laboratory data. The large and long-term multicenter clinical trials test promising but unproven interventions such as hormone therapy, diet, and supplements, to prevent major diseases and evaluate overall effects on health. The Branch has established an infrastructure to support the use of data and blood samples from the studies by the scientific community.

The Women's Health Initiative Memory Study (WHIMS), an ancillary study to the WHI, was designed to test whether hormone therapy prevents the development and progression of dementia symptoms in postmenopausal women.

Office of Biostatistics Research

The Office of Biostatistics Research (OBR) provides statistical expertise to the Institute and performs diverse functions in planning, designing, implementing, and analyzing NHLBI-sponsored studies. Its primary responsibility is to provide objective, statistically sound, and medically relevant solutions to problems. The OBR is expected to provide a new and valid statistical solution when presented with a problem for which techniques are not yet available. Its methodological interests concern survival analysis, longitudinal data analysis, and efficient study designs, including the monitoring of ongoing clinical studies for efficacy and safety. Recently the OBR has made contributions to statistical genetics and has extended its expertise to bioinformatics.

Division of Intramural Research

The DIR conducts laboratory and clinical research in heart, vascular, lung, blood, and kidney diseases and develops technology related to cardiovascular and pulmonary diseases. Areas of interest include the biology of experimental and clinical arteriosclerosis and its manifestations; pathophysiology of hypertensive vascular disease; functions of the lung; clinical and experimental studies on physiologic and pharmacologic aspects of heart, lung, and blood diseases; and a broad program of other basic research and technical developments related to them.

The DIR is organized into the four Centers and three Branches described below:

Biochemistry and Biophysics Center

The Biochemistry and Biophysics Center develops a global view of the molecular basis of structure–function relationships of proteins and biologically relevant molecules. It performs state-of-the-art nuclear magnetic resonance (NMR) spectroscopy studies of protein structure and functional interactions, develops mathematical tools for generating theoretical models of protein structure–function relationships, elucidates the mechanisms of enzyme function, and investigates the relationship between protein structure–function and cell signaling pathways.

Cell Biology and Physiology Center

The Cell Biology and Physiology Center develops a global view of the mechanisms that regulate cellular function and physiology. It evaluates the mechanisms that control different molecular machines within the cytosol, including those involved in muscle contraction and cytosolic and membrane transport processes. The Center studies cellular signaling events associated with hormone action, cytosolic trafficking, and energy metabolism; investigates the role of cellular processes on function and adaptation in whole-animal model systems; and develops unique measuring devices for studying biochemical and physiological processes in intact cells, whole animals, and clinical situations.

Genetics and Development Biology Center

The Genetics and Development Biology Center develops a global view of the mechanisms that regulate cardiovascular development and the etiology of congenital heart anomalies and CVD. It evaluates the function of specific genes and transcription factors in the development of the heart and other tissues, develops techniques and approaches for gene delivery and gene therapy in model systems, and works toward a better understanding of basic processes involved in regulating and interpreting the genetic code in development and disease.

Immunology Center

The Immunology Center develops a global view of the molecular basis of immune processes. It studies the intracellular and signaling processes involved in the activation of lymphocytes and mast cells, investigates the mechanisms by which drugs and other agents result in allergic–autoimmune reactions, and relates the results to the development of new diagnostic and therapeutic approaches in humans.

Translational Medicine Branch

The Translational Medicine Branch conducts biomedical research directed at defining at the molecular level, normal and abnormal biologic function. It develops diagnostic and therapeutic modalities for the treatment and understanding of CVD and implements mechanism-based clinical studies centered on innovative discoveries and observations from inside and outside the Branch.

Hematology Branch

The Hematology Branch conducts basic and clinical research on normal and abnormal hematopoiesis. Areas of interest include bone marrow failure, viral infections of hematopoietic cells, gene therapy of hematologic and malignant diseases, bone marrow transplantation, and mechanisms of immunologically mediated syndromes such as graft-versus-host disease and autoimmune diseases.

Pulmonary and Vascular Medicine Branch

The Pulmonary and Vascular Medicine Branch conducts research on the lung, heart, and systemic vasculature directed at defining—at the molecular, biochemical, and functional levels—normal physiological function and novel mechanisms of disease. It conducts research on emerging diseases of the lung characterized by unknown etiology and molecular pathogenesis. Areas of interest include lung diseases in blacks such as sickle cell lung disease and sarcoidosis; the role of nitric oxide, nitrite, gender, preconditioning, and mitochondrial function on the modulation of ischemia and reperfusion injury of the heart and lung; and translational study and drug development for therapeutic modulation of vascular, pulmonary, and cardiac cellular and molecular dysfunction in diseases of the lung and heart.

Division for the Application of Research Discoveries

The DARD supports national and international research translation, dissemination, and utilization programs to speed the application of scientific advances in

prevention, detection, and treatment of cardiovascular, lung, and blood diseases and to shorten the time between the discovery and delivery of research advances. Through knowledge networks, education programs, community outreach, conferences, and symposia, the Division provides opportunities for multidirectional communication and collaboration among researchers, clinical and public health practitioners, patients, and the general public. It connects research and practice by identifying knowledge gaps that should be addressed by future research; synthesizing and organizing evidence related to priority diseases and conditions; facilitating knowledge-sharing and collaboration with key stakeholders; and reaching out to people in high risk, low-income, and minority communities to eliminate health disparities.

The Division is organized into the three Branches described below.

Research Translation Branch

The Research Translation Branch synthesizes and organizes new scientific evidence related to priority diseases and conditions to facilitate rapid translation of research findings. It identifies knowledge gaps to inform future research directions and promotes the use of evidence-based reviews. The Branch develops or facilitates the development of clinical guidelines with relevant stakeholders. It also develops innovative implementation approaches for use in clinical and public health practice; maximizes opportunities for researchers and users of research to discuss research applicability, relevance, and utility; and addresses future research needs through knowledge networks and other strategies.

Enhanced Dissemination and Utilization Branch

The Enhanced Dissemination and Utilization Branch collects, synthesizes, and communicates new knowledge and recommendations for the dissemination and utilization of research-based findings to diverse target audiences, including minority and underserved groups. It provides technical assistance and information resources to NHLBI grantees to enhance their dissemination plans and practices. The Branch accelerates the introduction of evidence-based tools and education programs into community practice and establishes community-based Enhanced Dissemination and Utilization Centers to apply the latest research advances and evaluate their effects in multiple settings, achieve the U.S. Department of Health and Human Services (HHS) Healthy People 2010 goals, and eliminate health disparities.

Health Communications and Social Marketing Branch

The Health Communications and Social Marketing Branch uses the latest health and consumer communications and behavioral and social marketing research to plan health communications strategies and develops consumer messages and public education campaigns. It operates the NHLBI Health Information Center to respond to professional and public inquiries.

3. Important Events

June 16, 1948. President Harry S. Truman signs the National Heart Act, creating the NHI in the Public Health Service (PHS), with the National Advisory Heart Council as its advisory body.

July 7, 1948. Dr. Paul Dudley White is selected to be "Executive Director of the National Advisory Heart Council and Chief Medical Advisor to the National Heart Institute" under section 4b of the National Heart Act.

August 1, 1948. The NHI is established as an institute of the NIH by Surgeon General Leonard A. Scheele. As legislated in the National Heart Act, the NHI assumes responsibility for heart research, training, and administration. Intramural research projects in CVD and gerontology conducted elsewhere in the NIH are transferred to the NHI. The Director of the NHI assumes all leadership for the total PHS heart program. Dr. Cassius J. Van Slyke is appointed as the first Director of the NHI.

August 29, 1948. Surgeon General Scheele announces the membership of the first National Advisory Heart Council. Varying terms of membership for the 16-member Council commence September 1.

September 8, 1948. The National Advisory Heart Council holds its first meeting.

January 1949. Cooperative Research Units are established at four institutions: the University of California, the University of Minnesota, Tulane University, and Massachusetts General Hospital. Pending completion of the NHI's own research organization and facilities, the Units are jointly financed by the NIH and the institutions.

July 1, 1949. The NHI Intramural Research Program is established and organized on three general research levels consisting of three laboratory sections, five laboratory–clinical sections, and four clinical sections. The Heart Disease Epidemiology Study at Framingham, Massachusetts, is transferred from the Bureau of State Services, PHS, to the NHI.

January 18–20, 1950. The NHI and the American Heart Association jointly sponsor the first National Conference on Cardiovascular Diseases to summarize current knowledge and to make recommendations concerning further progress against heart and blood vessel diseases.

December 1, 1952. Dr. James Watt is appointed Director of the NHI, succeeding Dr. Van Slyke, who is appointed Associate Director of the NIH.

July 6, 1953. The Clinical Center admits its first patient for heart disease research.

July 1, 1957. The first members of the NHI Board of Scientific Counselors begin their terms. The Board was established in 1956 "to provide advice on matters of general policy, particularly from a long-range viewpoint, as they relate to the intramural research program."

February 19, 1959. The American Heart Association and the NHI present a report to the Nation—*A Decade of Progress Against Cardiovascular Disease*.

April 21, 1961. The President's Conference on Heart Disease and Cancer, whose participants on March 15 were requested by President John F. Kennedy to assist "in charting the Government's further role in a national attack on these diseases," convenes at the White House and submits its report.

September 11, 1961. Dr. Ralph E. Knutti is appointed Director of the NHI, succeeding Dr. Watt, who becomes head of international activities for the PHS.

December 30, 1963. February is designated as "American Heart Month" by a unanimous joint resolution of Congress with approval from President Lyndon B. Johnson.

November 22–24, 1964. The Second National Conference on Cardiovascular Diseases, cosponsored by the American Heart Association, the NHI,

and the Heart Disease Control Program of the PHS, is held to evaluate progress since the 1950 Conference and to assess needs and goals for continued and accelerated growth against heart and blood vessel diseases.

December 9, 1964. The President's Commission on Heart Disease, Cancer, and Stroke, appointed by President Johnson on March 7, 1964, submits its report to "recommend steps that can be taken to reduce the burden and incidence of these diseases."

August 1, 1965. Dr. William H. Stewart assumes the Directorship of the NHI upon Dr. Knutti's retirement.

September 24, 1965. Dr. William H. Stewart, NHI Director, is named Surgeon General of the PHS.

October 6, 1965. In FY 1966, Supplemental Appropriations Act (P.L. 89–199) allocates funds to implement the recommendations of the President's Commission on Heart Disease, Cancer, and Stroke that are within existing legislative authorities. The NHI is given $5.05 million for new clinical training programs, additional graduate training grants, cardiovascular clinical research centers on cerebrovascular disease and thrombotic and hemorrhagic disorders, and planning grants for future specialized cardiovascular centers.

March 8, 1966. Dr. Robert P. Grant succeeds Dr. Stewart as Director of the NHI. Dr. Grant serves until his death on August 15, 1966.

November 6, 1966. Dr. Donald S. Fredrickson is appointed Director of the NHI.

March 15, 1968. Dr. Theodore Cooper succeeds Dr. Fredrickson as Director of the NHI, the latter electing to return to research activities with the Institute.

October 16, 1968. Dr. Marshall W. Nirenberg is awarded a Nobel Prize in Physiology or Medicine for discovering the key to deciphering the genetic code. Dr. Nirenberg, chief of the NHI Laboratory of Biochemical Genetics, is the first Nobel Laureate at the NIH and the first Federal employee to receive a Nobel Prize.

October 26, 1968. The NHI receives the National Hemophilia Foundation's Research and Scientific Achievement Award for its "medical leadership . . . , tremendous stimulation and support of research activities directly related to the study and treatment of hemophilia."

November 14, 1968. The 20th anniversary of the NHI is commemorated at the White House under the auspices of President Johnson and other distinguished guests.

August 12, 1969. A major NHI reorganization plan creates five program branches along disease category lines in extramural programs (arteriosclerotic disease, cardiac disease, pulmonary disease, hypertension and kidney diseases, and thrombotic and hemorrhagic diseases); a Therapeutic Evaluations Branch and an Epidemiology Branch under the Associate Director for Clinical Applications; and three offices in the Office of the Director (heart information, program planning, and administrative management).

November 10, 1969. The NHI is redesignated by the Secretary, Health, Education, and Welfare (HEW), as the National Heart and Lung Institute (NHLI), reflecting a broadening scope of its functions.

February 18, 1971. President Richard M. Nixon's Health Message to Congress identifies sickle cell anemia as a high-priority disease and calls for increased Federal expenditures. The Assistant Secretary for Health and Scientific Affairs, HEW, is assigned lead-Agency responsibility for coordination of the National Sickle Cell Disease Program at the NIH and NHLI.

June 1971. The Task Force on Arteriosclerosis, convened by Dr. Cooper, presents its report. Volume I addresses general aspects of the problem and presents the major conclusions and recommendations in nontechnical language. Volume II contains technical information on the state of knowledge and conclusions and recommendations in each of the following areas: atherogenesis, presymptomatic atherosclerosis, overt atherosclerosis, and rehabilitation.

May 16, 1972. The National Sickle Cell Anemia Control Act (P.L. 92–294) provides for a national diagnosis, control, treatment, and research program. The Act does not mention the NHLI but has special pertinence because the Institute has been designated to coordinate the National Sickle Cell Disease Program.

June 12, 1972. Elliot Richardson, Secretary, HEW, approves a nationwide program for high blood pressure information and education and appoints two committees to implement the program: the Hypertension Information and Education Advisory Committee, chaired by the Director, NIH, and the Interagency Working Group,

chaired by the Director, NHLI. A High Blood Pressure Information Center is established within the NHLI Office of Information to collect and disseminate public and professional information about the disease.

July 1972. The NHLI launches its National High Blood Pressure Education Program (NHBPEP), a program of patient and professional education that has as its goal to reduce death and disability related to high blood pressure.

July 14, 1972. Secretary Richardson approves reorganization of the NHLI, with the Institute elevated to Bureau status within the NIH and comprising seven division-level components: Office of the Director, Division of Heart and Vascular Diseases (DHVD), DLD, DBDR, DIR, Division of Technological Applications, and Division of Extramural Affairs (DEA).

September 19, 1972. The National Heart, Blood Vessel, Lung, and Blood Act of 1972 (P.L. 92–423) expands the authority of the Institute to advance the national attack on the diseases within its mandate. The act calls for intensified and coordinated Institute activities to be planned by the Director and reviewed by the National Heart and Lung Advisory Council.

July 24, 1973. The first Five-Year Plan for the National Heart, Blood Vessel, Lung, and Blood Program is transmitted to the President and to Congress.

December 17, 1973. The National Heart and Lung Advisory Council completes its First Annual Report on the National Program.

February 13, 1974. The Director of the NHLI forwards his First Annual Report on the National Program to the President for transmittal to Congress.

April 5, 1974. The Assistant Secretary for Health, HEW, authorizes release of the Report to the President by the President's Advisory Panel on Heart Disease. The report of the 20-member panel, chaired by Dr. John S. Millis, includes a survey of the problem of heart and blood vessel disorders and panel recommendations to reduce illness and death from them.

August 2, 1974. The Secretary, HEW, approves regulations governing the establishment, support, and operation of National Research and Demonstration Centers for heart, blood vessel, lung, and blood diseases, which implement section 415(b) of the PHS Act, as amended by the National Heart, Blood Vessel, Lung, and Blood Act of 1972: (1) to carry out basic and clinical research on heart, blood vessel, lung, and blood diseases; (2) to provide demonstrations of advanced methods of prevention, diagnosis, and treatment; and (3) to supply a training source for scientists and physicians concerned with the diseases.

September 16, 1975. Dr. Robert I. Levy is appointed Director of the NHLI, succeeding Dr. Theodore Cooper, who was appointed Deputy Assistant Secretary for Health, HEW, on April 19, 1974.

June 25, 1976. Legislation amending the PHS Act (P.L. 94–278) changes the name of the NHLI to the National Heart, Lung, and Blood Institute (NHLBI) and provides for an expansion in blood-related activities within the Institute and throughout the National Heart, Blood Vessel, Lung, and Blood Program.

August 1, 1977. The Biomedical Research Extension Act of 1977 (P.L. 95–83) reauthorizes the programs of the NHLBI, with continued emphasis on both the national program and related prevention and dissemination activities.

February 1978. The NHLBI and the American Heart Association jointly celebrate their 30th anniversaries.

September 1979. The Task Force on Hypertension, established in September 1975 to assess the state of hypertension research, completes its in-depth survey and recommendations for improved prevention, treatment, and control in 14 major areas. The recommendations are intended to guide the NHLBI in its future efforts.

November 1979. The results of the Hypertension Detection and Follow-Up Program (HDFP), a major clinical trial started in 1971, provide evidence that tens of thousands of lives are being saved through treatment of mild hypertension and that perhaps thousands more could be saved annually if all people with mild hypertension were under treatment.

November 21, 1980. The Albert Lasker Special Public Health Award is presented to the NHLBI for its HDFP, "which stands alone among clinical studies in its profound potential benefit to millions of people."

December 17, 1980. The Health Programs Extension Act of 1980 (P.L. 96–538) reauthorizes the NHLBI, with continued emphasis on both the national program and related prevention programs.

September 8, 1981. The Working Group on Arteriosclerosis, convened in 1978 to assess present understanding, highlight unresolved problems, and emphasize opportunities for future research in arteriosclerosis, completes its report. Volume I presents conclusions and recommendations in nontechnical language. Volume II provides an in-depth substantive basis for the conclusions and recommendations contained in Volume I.

October 2, 1981. The Beta-Blocker Heart Attack Trial (BHAT) demonstrates benefits to those in the trial who received the drug propranolol compared with the control group.

July 6, 1982. Dr. Claude Lenfant is appointed Director of the NHLBI. He succeeds Dr. Levy.

September 1982. The results of the Multiple Risk Factor Intervention Trial are released. They support measures to reduce cigarette smoking and to lower blood cholesterol to prevent coronary heart disease (CHD) mortality but raise questions about optimal treatment of mild hypertension.

October 26, 1983. The Coronary Artery Surgery Study (CASS) results are released. They demonstrate that mildly symptomatic patients with coronary artery disease can safely defer coronary artery bypass surgery until symptoms worsen.

January 12, 1984. The results of the Lipid Research Clinics Coronary Primary Prevention Trial (LRC-CPPT) are released. They establish conclusively that reducing total blood cholesterol reduces the risk of CHD in men at increased risk because of elevated cholesterol levels. Each 1 percent decrease in cholesterol can be expected to reduce heart attack risk by 2 percent.

April–September 1984. The *Tenth Report of the Director, NHLBI*, commemorates the 10th anniversary of the passage of the National Heart, Blood Vessel, Lung, and Blood Act. The five-volume publication reviews 10 years of research progress and presents a 5-year research plan for the national program.

April 1984. The Division of Epidemiology and Clinical Applications (DECA) is created. It provides the Institute with a single focus on clinical trials; prevention, demonstration, and education programs; behavioral medicine; nutrition; epidemiology; and biometry. It also provides new opportunities to examine the interrelationships of cardiovascular, respiratory, and blood diseases.

November 1984. An NHLBI-NIH Clinical Center inter-Agency agreement for studies on the transmission of HIV from humans to chimpanzees leads to the first definitive evidence that the transmission is by blood transfusion.

April 1985. Results of Phase I of the Thrombolysis in Myocardial Infarction (TIMI) trial comparing streptokinase (SK) with recombinant tissue plasminogen activator (t-PA) are published. The new thrombolytic agent recombinant t-PA is approximately twice as effective as SK in opening thrombosed coronary arteries.

October 1985. The NHLBI Smoking Education Program is initiated to increase health care provider awareness about clinical opportunities for smoking cessation programs, techniques for use within health care settings, and resources for use within communities to expand and reinforce such efforts.

October 14, 1985. NHLBI-supported researchers Michael S. Brown and Joseph L. Goldstein are awarded the Nobel Prize in Physiology or Medicine for their discoveries concerning the regulation of cholesterol metabolism.

November 1985. The NHLBI inaugurates the National Cholesterol Education Program (NCEP) to increase awareness among health professionals and the public that elevated blood cholesterol is a cause of CHD and that reducing elevated blood cholesterol levels will contribute to the reduction of CHD.

June 1986. Results of the Prophylactic Penicillin Trial demonstrate the efficacy of prophylactic penicillin therapy in reducing the morbidity and mortality associated with pneumococcal infections in children with SCD.

September 18, 1986. The NHLBI sponsors events on the NIH campus in conjunction with the meeting of the X World Congress of Cardiology in Washington, DC. Activities include a special exhibit at the National Library of Medicine entitled "American Contributions to Cardiovascular Medicine and Surgery" and two symposia—"New Dimensions in Cardiovascular Disease Research" and "Cardiovascular Nursing and Nursing Research."

December 17, 1986. The citizens of Framingham, Massachusetts, are presented a tribute by the Assistant Secretary, HHS, for their participation in the Framingham Heart Study over the past 40 years.

September 1987. The NHLBI commemorates the centennial of the NIH and the 40th anniversary of the Institute's inception. Two publications prepared for the Institute's anniversary, *Forty Years of Achievement in Heart, Lung, and Blood Research* and *A Salute to the Past: A History of the National Heart, Lung, and Blood Institute*, document significant Institute contributions to research and summarize recollections about the Institute's 40-year history.

October 1987. The National Blood Resource Education Program is established to ensure an adequate supply of safe blood and blood components to meet the Nation's needs and to ensure that blood and blood components are transfused only when therapeutically appropriate.

April 1988. The NHLBI initiates its Minority Research Supplements program to provide supplemental funds to ongoing research grants for support of minority investigators added to research teams.

September 1988. AIDS research is added to the National Heart, Blood Vessel, Lung, and Blood Diseases and Blood Resources Program. It is the first area of research to be added since the Program was established in 1973.

September 1988. The NHLBI funds the first of its new Programs of Excellence in Molecular Biology, designed to foster the study of the organization, modification, and expression of the genome in areas of importance to the Institute and to encourage investigators to become skilled in the experimental strategies and techniques of modern molecular biology.

September 1988. The Strong Heart Study is initiated. It focuses on CVD morbidity and mortality rates and distribution of CVD risk factors in three geographically diverse American Indian groups.

October 1988. The National Marrow Donor Program is transferred from the Department of the Navy to the NHLBI. The Program, which serves as a focal point for bone marrow research, includes a national registry of volunteers who have offered to donate marrow for transplant to patients not having suitably matched relatives.

March 1989. The NHLBI initiates a National Asthma Education Program to raise awareness of asthma as a serious chronic disease and to promote more effective management of asthma through patient and professional education.

May 1989. The NHLBI Minority Access to Research Careers (MARC) Summer Research Training Program is initiated to provide an opportunity for MARC Honors Scholars to work with researchers in the NHLBI intramural laboratories.

September 14, 1990. The first human gene therapy protocol in history is undertaken at the NIH. A team of scientists, led by W. French Anderson, NHLBI, and R. Michael Blaese, NCI, insert a normal gene into a patient's cells to compensate for a defective gene that left the patient's cells unable to produce an enzyme essential to the functioning of the body's immune system.

January 1991. The NHLBI Obesity Education Initiative (OEI) begins. Its objective is to make a concerted effort to educate the public and health professionals about obesity as an independent risk factor for CVD and its relationship to other risk factors, such as high blood pressure and high blood cholesterol.

February 1991. The expert panel of the National Asthma Education Program releases its report, *Guidelines for Diagnosis and Management of Asthma*, to educate physicians and other health care providers in asthma management.

April 8–10, 1991. The First National Conference on Cholesterol and Blood Pressure Control is attended by more than 1,800 health professionals.

May 1991. The Task Force on Hypertension, established in November 1989 to assess the state of hypertension research and to develop a plan for future NHLBI funding, presents its conclusions. The report outlines a set of scientific priorities and develops a comprehensive plan for support over the next several years.

June 11, 1991. The NHLBI initiates a National Heart Attack Alert Program (NHAAP) to reduce premature morbidity and mortality from acute myocardial infarction (AMI) and sudden death. The Program emphasizes rapid disease identification and treatment.

July 1991. Results of the Systolic Hypertension in the Elderly Program (SHEP) demonstrate that low-dose pharmacologic therapy of isolated systolic hypertension in those older than 60 years of age significantly reduces stroke and myocardial infarction.

August 1991. Results of the Studies of Left Ventricular Dysfunction (SOLVD) are released. They demonstrate that use of the angiotensin-converting enzyme (ACE) inhibitor enalapril causes a significant reduction in mortality and hospitalization for congestive heart failure in patients with symptomatic heart failure.

August 1991. The NHLBI sponsors the first national workshop, "Physical Activity and Cardiovascular Health: Special Emphasis on Women and Youth," to assess the current knowledge in the field and to develop scientific priorities and plans for support. Recommendations from the Working Groups are published in the supplemental issue of *Medicine and Science in Sports and Exercise*.

March 1992. The *International Consensus Report on Diagnosis and Management of Asthma* is released. It is to be used by asthma specialists and medical opinion leaders to provide a framework for discussion of asthma management pertinent to their respective countries.

March 1992. Results of the Trials of Hypertension Prevention Phase I are published. They demonstrate that both weight loss and reduction of dietary salt reduce blood pressure in adults with high-normal diastolic blood pressure and may reduce the incidence of primary hypertension.

June 26–27, 1992. The Fourth National Minority Forum on Cardiovascular Health, Pulmonary Disorders, and Blood Resources is attended by nearly 600 individuals.

October 11–13, 1992. The First National Conference on Asthma Management is attended by more than 900 individuals.

October 30, 1992. A celebration of the 20th anniversary of the NHBPEP is held in conjunction with the NHBPEP Coordinating Committee meeting. The *Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure* (JNC V) and the *NHBPEP Working Group Report on the Primary Prevention of Hypertension* are released.

June 10, 1993. The NIH Revitalization Act of 1993 (P.L. 103–43) establishes the NCSDR within the NHLBI.

June 15, 1993. The *Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP II) is released to the public at a press conference held in conjunction with the NCEP Coordinating Committee meeting.

January 30, 1995. Results of the Multicenter Study of Hydroxyurea (MSH) are released through a clinical alert. They demonstrate that hydroxyurea reduced the number of painful episodes by 50 percent in severely affected adults with SCD. This is the first effective treatment for adult patients with this disorder.

September 1995. The NHLBI funds a new Program of Specialized Centers of Research in Hematopoietic Stem Cell Biology, which is designed to advance our knowledge of stem cell biology and enhance our ability to achieve successful stem cell therapy to cure genetic and acquired diseases.

September 21, 1995. Results of the Bypass Angioplasty Revascularization Investigation are released through a clinical alert. They demonstrate that patients on drug treatment for diabetes who had blockages in two or more coronary arteries and were treated with coronary artery bypass graft (CABG) surgery had, at 5 years, a death rate markedly lower than that of similar patients treated with angioplasty. The clinical alert recommends CABG over standard angioplasty for patients on drug therapy for diabetes who have multiple coronary blockages and are first-time candidates for either procedure.

November 5–6, 1995. The first Conference on Socioeconomic Status (SES) and Cardiovascular Health and Disease is held to determine future opportunities and needs for research on SES factors and their relationships with cardiovascular health and disease.

December 4–5, 1995. A celebration of the 10th anniversary of the NCEP is held in conjunction with the NCEP Coordinating Committee meeting. Results of the 1995 Cholesterol Awareness Surveys of physicians and the public are released.

May 1996. The NHLBI announces results from the Framingham Heart Study that conclude earlier and more aggressive treatment of hypertension is vital to preventing congestive heart failure. The Treatment of Mild Hypertension Study (TOMHS) demonstrates that lifestyle changes, such as weight loss, a healthy eating plan, and physical activity, are crucial for reducing blood lipids in those treated for Stage I hypertension.

September 1996. Findings from the Asthma Clinical Research Network (ACRN) show that for people with asthma, taking an inhaled beta-agonist at regularly scheduled times is safe but provides no greater benefit than taking the medication only when asthma symptoms

occur. The recommendation to physicians who treat patients with mild asthma is to prescribe inhaled beta-agonists only on an as-needed basis.

November 13, 1996. The NHLBI releases findings from two studies, Dietary Approaches to Stop Hypertension (DASH) Trial and Trial of Nonpharmacologic Intervention in the Elderly (TONE). The DASH Trial demonstrates that a diet low in fat and high in vegetables, fruits, fiber, and low-fat dairy products significantly and quickly lowers blood pressure. The TONE shows that weight loss and reduction of dietary sodium safely reduce the need for antihypertensive medication in older patients while keeping their blood pressure under control.

January 1997. Definitive results from the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) program are published. They show that atherosclerosis develops before age 20 and that the following risk factors affect the progression of atherosclerosis equally in women and men, regardless of race: low high-density lipoprotein (HDL) cholesterol, high low-density lipoprotein (LDL) cholesterol, and cigarette smoking.

February 24, 1997. The National Asthma Education and Prevention Program (NAEPP) releases the *Expert Panel Report 2, Guidelines for the Diagnosis and Management of Asthma* to the public at a press conference held in conjunction with a meeting of the American Academy of Allergy, Asthma, and Immunology in San Francisco.

May 8, 1997. Results of the Antiarrhythmic Versus Implantable Defibrillator (AVID) clinical trial are presented. They show that an implantable cardiac defibrillator reduces mortality compared to pharmacologic therapy in patients at high risk for sudden cardiac death.

September 1997. The Stroke Prevention Trial in Sickle Cell Anemia (STOP) is terminated early because prophylactic transfusion resulted in a 90 percent relative decrease in the stroke rate among children 2 to 16 years old.

September 1997. The Institute's National Sickle Cell Disease Program celebrates its 25th anniversary.

October 1997. The NHLBI commemorates the 50th anniversary of the Institute's inception. A publication prepared for the Institute's anniversary, *Vital Signs: Discoveries in Diseases of the Heart, Lungs, and Blood* documents the remarkable research advances of the past 50 years.

October 1, 1997. The WHI, initiated in 1991, is transferred to the NHLBI.

November 6, 1997. The *Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC VI) is released at a press conference held in conjunction with the 25th anniversary meeting and celebration of the NHBPEP Coordinating Committee.

December 1997. Findings from the Trial To Reduce Alloimmunization to Platelets (TRAP) demonstrate that leucocyte reduction by filtration or ultraviolet B irradiation of platelets—both methods are equally effective—decreases development of lymphocytotoxic antibodies and alloimmune platelet refractoriness.

February 1998. The Task Force on Behavioral Research in Cardiovascular, Lung, and Blood Health and Disease, established in November 1995 to develop a plan for future NHLBI biobehavioral research in cardiovascular, lung, and blood diseases and sleep disorders, presents its recommendations. The report outlines a set of scientific priorities and develops a comprehensive plan for support over the next several years.

February 19–21, 1998. The NHLBI and cosponsors—California CVD Prevention Coalition; California Department of Health Services; CVD Outreach, Resources, and Epidemiology Program; and the University of California, San Francisco—hold Cardiovascular Health: Coming Together for the 21st Century, A National Conference, in San Francisco.

March 16, 1998. A special symposium is held at the annual meeting of the American Academy of Asthma, Allergy, and Immunology to celebrate 50 years of NHLBI-supported science.

June 17, 1998. The NHLBI, in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), releases *Clinical Guidelines on the Identification, Treatment, and Evaluation of Overweight and Obesity in Adults: Evidence Report*.

December 11, 1998. World Asthma Day is established on this date. The NAEPP launches the Asthma Management Model System, an innovative Web-based information management tool.

March 1999. The ARDS Network Study of Ventilator Management in ARDS is stopped early so that critical care specialists can be alerted to the results. The study demonstrated that approximately 25 percent fewer deaths occurred among intensive care patients with ARDS receiving small, rather than large, breaths of air from a mechanical ventilator.

March 22, 1999. The NAEPP holds its 10th anniversary meeting and celebration to recognize a decade of progress and a continued commitment to the future.

August 1999. Results of the Early Revascularization for Cardiogenic Shock are released. They show improved survival at 6 months in patients treated with balloon angioplasty or coronary bypass surgery compared with patients who receive intensive medical care to stabilize their condition.

September 27–29, 1999. The NHLBI sponsors the National Conference on Cardiovascular Disease Prevention: Meeting the Healthy People 2010 Objectives for Cardiovascular Health.

November 2, 1999. The NAEPP convenes a Workshop on Strengthening Asthma Coalitions: Thinking Globally, Acting Locally to gather information from coalition representatives on ways the NAEPP could support their efforts.

November 2–3, 1999. The NHLBI sponsors a Workshop on Research Training and Career Development.

March 8, 2000. A part of the Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT) is terminated early because one of the tested drugs, an alpha-adrenergic blocker, was found to be less effective than the more traditional diuretic in reducing some forms of CVD.

March 29, 2000. The NHLBI launches the Web-based Healthy People 2010 Gateway to provide information and resources on cardiovascular health, asthma, sleep, and minority populations.

April 25, 2000. The NHLBI sponsors a special expert meeting, Scientific Frontiers in Cardiothoracic Surgery, to discuss the future of cardiothoracic research.

September 2000. NHLBI-supported investigators identify a gene for primary pulmonary hypertension.

October 2000. Results from the Childhood Asthma Management Program (CAMP) demonstrate that inhaled corticosteroids are safe and effective for long-term treatment of children with mild-to-moderate asthma.

January 2001. Results of the DASH-Sodium Trial are released. They show that dietary sodium reduction substantially lowers blood pressure in persons with high blood pressure; the greatest effect occurs when sodium reduction is combined with the DASH diet.

February 2001. The NHLBI launches a sleep education program for children, using star sleeper Garfield the Cat.

February 1, 2001. The NHLBI, along with the HHS Office of Disease Prevention and Health Promotion, the Office of the Surgeon General, the Centers for Disease Control and Prevention (CDC), the NINDS, and the American Heart Association, signs a memorandum of understanding to focus and coordinate their efforts to meet the Healthy People 2010 objectives on cardiovascular health.

March 26–27, 2001. A strategy development workshop, "Women's Heart Health: Developing a National Health Education Action Plan," is held to develop an agenda for the NHLBI's new heart health education effort directed at women.

April 2001. The NHLBI releases the international guidelines for diagnosis, management, and prevention of COPD.

April 2001. NHLBI-supported investigators identify genes that regulate human cholesterol levels.

May 2001. The NHLBI releases the NCEP's *Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP III).

June 2001. NHLBI-supported investigators find that human heart muscle cells regenerate after a heart attack.

July 2001. A self-contained artificial heart is implanted in a patient for the first time.

August 2001. Early results from the National Emphysema Treatment Trial (NETT) identify characteristics of patients at high risk for death following lung volume reduction surgery.

August 2001. Scientists from the NHLBI SCOR program at Yale University identify two genes responsible for pseudohypoaldosteronism type II, a rare Mendelian form of high blood pressure. These genes encode for protein kinases involved in a previously unknown pathway and may provide new targets for therapy.

September 10, 2001. The NHLBI, along with the American Heart Association and other partners, launches a national campaign, "Act in Time to Heart Attack Signs," to increase awareness of the signs of heart attack and the need for a fast response.

October 2001. NHLBI-supported scientists report that the drug, infliximab, increases risk of TB reactivation and dissemination. The drug is used to treat refractory rheumatoid arthritis and Crohn's disease and is proposed as a treatment for several chronic lung diseases.

November 2001. Results of the Randomized Evaluation of Mechanical Assistance for the Treatment of Chronic Heart Failure Trial demonstrate that using an implanted left ventricular assist device can prolong survival and improve quality of life in severely ill patients who are not candidates for heart transplantation.

December 2001. For the first time, scientists correct SCD in mice using gene therapy.

April 10, 2002. The World Hypertension League (WHL) and the NHLBI hold an international symposium; subsequently they prepare an action plan at the WHL Council Conference to control hypertension and obesity.

April 11–13, 2002. The NHLBI and cosponsors—the HHS Office of Disease Prevention and Health Promotion, the CDC, the American Heart Association, the Centers for Medicare & Medicaid Services, and the Health Resources and Services Administration—hold a national conference, "Cardiovascular Health for All: Meeting the Challenge of Healthy People 2010."

June 2002. The NAEPP issues an update of selected topics in the *Guidelines for the Diagnosis and Management of Asthma*.

June 2002. The fourth edition of *The Management of Sickle Cell Disease*, which describes the current approach to counseling SCD patients and managing many of the medical complications of SCD, is issued to coincide with the 30th anniversary of the NHLBI Sickle Cell Program.

July 9, 2002. The NHLBI stops early the trial of the estrogen plus progestin component of the WHI due to increased breast cancer risk and lack of overall benefits. The multicenter trial also found increases in CHD, stroke, and pulmonary embolism in participants on estrogen plus progestin compared to women taking placebo pills.

August 2002. NHLBI-supported scientists identify a gene variant that is associated with arrhythmia in blacks.

December 4, 2002. Results of the Atrial Fibrillation Follow-Up Investigation of Rhythm Management Trial (AFFIRM) indicate that rate control rather than rhythm control may be the preferred approach for patients with atrial fibrillation. The rate control strategy involves the use of less expensive drugs and results in fewer hospitalizations.

December 17, 2002. Results of the ALLHAT, the largest hypertension clinical trial ever conducted, show that less expensive traditional diuretics are at least as good as newer medicines (calcium channel blocker and ACE inhibitors) in treating high blood pressure and preventing some forms of heart disease.

January 23, 2002. An NHLBI-supported study demonstrates that magnetic resonance imaging can be used to detect heart attacks faster and more accurately than traditional methods in patients who arrive at the emergency room with chest pain.

February 24, 2002. The Prevention of Recurrent Venous Thromboembolism Trial is stopped early because treatment with low-dose warfarin to prevent recurrence of deep vein thrombosis and pulmonary embolism was so beneficial.

April 2003. Results of the MSH Patients' Follow-Up Study show that the adult patients who took hydroxyurea over a 9-year period experienced a 40 percent reduction in deaths. Survival was related to fetal hemoglobin levels and frequency of vaso-occlusive events.

April 23, 2003. Results of the PREMIER trial of behavioral lifestyle interventions for blood pressure control show that individuals with prehypertension or stage I hypertension can lower their blood pressure by making multiple lifestyle changes.

May 14, 2003. The *Seventh Report of the Joint National Committee on the Prevention, Detection,*

Evaluation, and Treatment of High Blood Pressure (JNC VII) is released.

May 22, 2003. The NETT finds that lung volume reduction surgery (LVRS) benefits emphysema patients with certain clinical characteristics. The findings will be useful in the determination of Medicare coverage policy.

July 2003. The NHLBI and Gen-Probe Corporation succeed in developing a test to screen donated blood for the West Nile Virus.

August 2003. The NHLBI establishes a partnership with the Canadian Institutes of Health Research (CIHR) to advance research on cardiovascular, respiratory, and blood diseases.

November 2003. The Public Access Defibrillation Trial demonstrates that use of an automated external defibrillator and CPR by trained community volunteers can increase survival for victims of sudden cardiac arrest.

March 2004. The NIH stops the estrogen-alone component of the WHI early due to the increased risk of stroke and deep vein thrombosis. Estrogen does not appear to affect heart disease.

March 2004. Preliminary results of the Sudden Cardiac Death in Heart Failure Trial demonstrate that an implantable cardiac defibrillator can reduce death in heart failure patients.

July 2004. The NHLBI releases an update to the 2001 NCEP ATP III guidelines on the treatment of high blood cholesterol in adults.

August 2004. The NHBPEP Working Group on High Blood Pressure in Children and Adolescents releases the *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents*.

August 2004. An NHLBI-funded study shows that nucleic acid amplification testing for HIV-1 and hepatitis C virus (HCV) further safeguards the Nation's blood supply.

October 2004. Results from a new study of adults with mild asthma by researchers participating in the ACRN demonstrate that genes affect patient response, over time, to daily doses of inhaled albuterol, a drug used for relief of acute asthma symptoms. A few weeks of its regular use improves overall asthma control in individuals with one form of the gene, but stopping all use of albuterol eventually improves asthma control in those with another form of the gene. The findings could lead to better ways to individualize asthma therapy.

November 2004. Results of the Prevention of Events With Angiotensin Converting Enzyme Inhibition (PEACE) demonstrate that many heart disease patients who are already receiving state-of-the-art therapy do not gain extra cardiovascular protection from ACE inhibitors.

December 2004. The NHLBI stops early the Stroke Prevention in Sickle Cell Anemia Trial II (STOP II) so that physicians who treat children with sickle cell anemia can be alerted to its findings. STOP II, which is a study to determine whether children with sickle cell anemia and at high risk for stroke could at some point safely stop receiving the periodic blood transfusions that prevent strokes, shows that children revert to high risk for stroke when transfusions are stopped.

January 2005. The NHLBI issues new guidelines for managing asthma during pregnancy.

January 26, 2005. Dr. Elizabeth G. Nabel is appointed Director of the NHLBI. She succeeds Dr. Claude Lenfant.

February 2005. NHLBI-supported scientists identify two genetic mutations common in individuals of African descent that are associated with a 40 percent reduction in LDL cholesterol.

February 15, 2006. Results from the WHI Calcium and Vitamin D Trial show that calcium and vitamin D supplements in healthy postmenopausal women provide a modest improvement in bone mass preservation and prevent hip fractures in certain groups, including older women, but do not prevent other types of fractures or colorectal cancer.

May 10, 2006. Results from the Childhood Asthma Research and Education (CARE) Network show that daily treatment with inhaled corticosteroids can reduce breathing problems in preschool-aged children at high risk for asthma, but does not prevent them from developing persistent asthma.

May 31, 2006. The Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) II finds that the ability to diagnose pulmonary embolism is improved when a commonly used imaging test of the chest to

detect potentially deadly blood clots in the lung is complemented by an extension of the scan to the legs—where the clots typically originate—or by a standard clinical assessment.

June 6, 2006. Results from the Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock (SHOCK) trial show that treating heart attack patients who have a life-threatening complication called cardiogenic shock with emergency angioplasty or bypass surgery greatly improves their long-term survival.

July 18, 2006. NHLBI scientists find that a hormone called brain natriuretic peptide or BNP, which can be detected in a simple blood test, can identify patients with SCD who have developed a life-threatening complication called pulmonary hypertension. The hormone is also a predictor of death in adult sickle cell patients.

July 26, 2006. Results from two randomized clinical trials demonstrate that inhaled nitric oxide administered within the first few weeks of life helps prevent chronic lung disease in some low birthweight premature infants. Moreover, when administered within 48 hours after birth, it appears to protect some premature newborns from brain injury.

September 19, 2006. The NHLBI launches a peripheral artery disease awareness and education campaign, "Stay in Circulation: Take Steps To Learn About P.A.D." (peripheral artery disease).

January 18, 2007. The NHLBI launches the Learn More Breathe Better campaign to increase COPD awareness among primary care physicians and the public.

August 29, 2007. The NAEPP issues the *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma—Full Report 2007,* an update of the latest scientific evidence and recommendations for clinical practice on asthma care.

October 1, 2007. The NHLBI launches an open access dataset for researchers worldwide. Known as SNP Health Association Resource (SHARe), the Web-based dataset will enable qualified researchers to access data from large population-based studies, starting with the landmark Framingham Heart Study. It is expected to accelerate discoveries linking genes and health, thereby advancing understanding of the causes and prevention of CVD and other disorders.

October 8, 2007. Mario Capecchi and Oliver Smithies, who are researchers supported by the NHLBI, are awarded the Nobel Prize in Physiology or Medicine for their creation of a gene-targeting technique that allows scientists to create transgenic mice that are genetically modified to develop human diseases.

December 3, 2007. The NHLBI announces a new strategic plan to guide its next decade of research, training, and education to reduce the national burden of cardiovascular, lung, and blood diseases and sleep disorders.

December 10, 2007. Results of the Occluded Artery Trial (OAT) are incorporated into practice guidelines: The American College of Cardiology/American Heart Association's *2007 Focused Update of the 2004 Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction*. The guidelines discourage percutaneous coronary intervention of a totally occluded artery late in the course of myocardial infarction in the absence of symptoms if patients are stable and do not have evidence of severe ischemia.

January 28, 2008. Results from the ALLHAT demonstrate that in people—especially blacks—who have high blood pressure as part of metabolic syndrome, diuretics offer greater protection against CVD, including heart failure, and are at least as effective for lowering blood pressure as newer, more expensive medications.

February 2008. The NHLBI stops one treatment arm of the Action to Control Cardiovascular Risk in Diabetes (ACCORD) clinical trial of adults who have type 2 diabetes at high risk for heart attack and stroke after a review of available data showed that participants following a medical strategy to lower blood glucose below current recommendations to near-normal levels increased the risk of death compared with a standard treatment strategy. All participants now follow a medical strategy to reach the standard blood sugar levels while the lipid and blood pressure components of the study continue.

February 2008. An independent panel convened by the NIH concludes that the use of hydroxyurea for treating SCD should be increased among adolescents and adults who have the disease.

February 29, 2008. The NHLBI issues the first U.S. guidelines for the diagnosis and management of von Willebrand Disease, the most common inherited bleeding disorder.

March 2008. The NHLBI announces a comprehensive restructuring of its SCD research program to take advantage of new scientific opportunities and make SCD resources more widely available.

March 4, 2008. The WHI Follow-up Study confirms that the health risks of long-term combination hormone therapy outweigh the benefits for postmenopausal women. Researchers report that about 3 years after women stopped taking combination hormone therapy, many of the health effects of hormones such as increased risk of heart disease are diminished, but overall risks of stroke, blood clots, and cancer remain high.

March 5, 2008. Scientists report that they have identified the variants of the gene VKORC1 that determine a patient's initial response to treatment with the blood-thinning (anticoagulant) drug warfarin. The finding is expected to enhance the ability of physicians to tailor the dosage of warfarin for individual patients.

April 2008. NHLBI-supported researchers identify gene variants associated with increased susceptibility to asthma and reduced lung function in three study populations. Risk for developing asthma is linked to variants in a gene called CHI3L1, which can be measured by checking levels of an inherited blood protein that it regulates.

April 14, 2008. The NHLBI, along with the NCI and National Institute of General Medical Sciences (NIGMS), sign a letter of intent with the Center for Genomic Medicine in Japan to create a Global Alliance for Pharmacogenomics to identify genetic factors that contribute to individual responses to medicines, including rare and dangerous side effects. Research results will eventually allow physicians to ensure the safety and optimize the effectiveness of drugs for each patient.

August 18, 2008. The NHLBI launches an educational Web site, "Children and Clinical Studies," which features documentary videos, text, and graphics designed to promote a better understanding of research in children for health care professionals and the public.

September 15, 2008. The Surgeon General's *Call to Action To Prevent Deep Vein Thrombosis and Pulmonary Embolism* is released. The *Call to Action*, which urges a coordinated, multifaceted plan to reduce the number of cases of deep vein thrombosis and pulmonary embolism nationwide, resulted from a Surgeon General's Workshop on Deep Vein Thrombosis co-sponsored by the NHLBI.

September 25, 2008. Researchers announce that they have developed a genetically altered animal model for CF that closely matches the characteristics of the disease in humans.

October 6, 2008. NIH scientists show that tipifarnib, an experimental anticancer drug, can prevent, and even reverse, potentially fatal cardiovascular damage in a mouse model of progeria (rare genetic disorder that causes the most dramatic form of human premature aging).

4. Disease Statistics

Cardiovascular, lung, and blood diseases constitute a large morbidity, mortality, and economic burden on individuals, families, and the Nation. Common forms are atherosclerosis, hypertension, COPD, and blood-clotting disorders—embolisms and thromboses. The most serious atherosclerotic diseases are CHD, as manifested by heart attack and angina pectoris, and cerebrovascular disease, as manifested by stroke.

In 2005, cardiovascular, lung, and blood diseases accounted for 1,101,000 deaths and 45 percent of all deaths in the United States (p. 33). The projected economic cost in 2009 for these diseases is expected to be $667 billion, 22 percent of the total economic costs of illness, injuries, and death (p. 49). Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD (including asthma) ranks fourth (p. 36). Cardiovascular and lung diseases account for 3 of the 4 leading causes of death (p. 36) and 4 of the 10 leading causes of infant death (p. 42). Hypertension, heart disease, asthma, and COPD are especially prevalent and account for substantial morbidity in Americans (p. 45).

The purpose of the biomedical research conducted by the NHLBI is to contribute to the prevention and treatment of cardiovascular, lung, and blood diseases and sleep disorders. National disease statistics show that by midcentury, morbidity and mortality from these diseases had reached record high levels. Since then, however, substantial improvements have been achieved, especially over the past 40 years, as shown by the significant decline in mortality rates. Because many of these diseases begin early in life, their early detection and control can reduce the risk of disability and can delay death. Although important advances have been made in the treatment and control of cardiovascular, lung, and blood diseases, these diseases continue to be a major burden on the Nation.

Mortality statistics in this chapter are for diseases or conditions classified as the underlying cause of death. Heart failure, however, is never truly an underlying cause even though 58,933 deaths in 2005 were nominally coded to it as the underlying cause. Therefore, in this chapter, mortality statistics attributed to heart failure represent it as either the underlying cause or a contributing cause of death.

The 2005 mortality statistics in this Fact Book are final counts. They differ from the 2005 mortality statistics presented in the FY 2007 Fact Book because those statistics were preliminary.

Cardiovascular Diseases

- In 2005, CVD caused 864,000 deaths—35 percent of all deaths (p. 33).
- Heart disease is the leading cause of death; the main form, CHD, caused 446,000 deaths in 2005 (pp. 34, 36).
- The annual number of deaths from CVD increased substantially between 1900 and 1970 and remains high (p. 35).
- The death rate (not age-adjusted) for CVD increased from 1920 until it peaked in 1968. Since then, the trend has been downward. In 2006, the rate was similar to the rate in the 1920s (p. 35).
- Cerebrovascular disease, the third leading cause of death, accounted for 144,000 deaths in 2005 (pp. 34, 36).
- Heart disease is second only to all cancers combined in years of potential life lost (p. 36).
- Heart disease is the leading cause of death in blacks, Hispanics, and American Indians, but second to cancer in Asians. Stroke ranks as the third or fourth leading cause of death in the minority groups, except in American Indians, where it ranks fifth (p. 36).
- Between 1970 and 1993, deaths with heart failure as the underlying or contributing cause more than doubled, but that was followed by hardly any increases from 1993 to 2005. The increase was a major exception to the mortality decline in CVD over the 23-year period (p. 37).
- Between 1985 and 2005, death rates for heart disease and stroke declined in men and women of all racial/ethnic groups. Declines in death rates for heart disease were steepest in whites and Asians (p. 38).

- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 1,086,000 fewer deaths from CHD in 2006 than would have occurred if there had been no decline (p. 39).
- Substantial improvements have been made in the treatment of CVD. Since 1975 or 1985, case-fatality rates from hospitalized AMI, stroke, heart failure, and cardiac dysrhythmia declined appreciably (p. 39).
- The decline in CHD mortality began earlier in the United States than in most countries and outpaced that in most countries until the 1990s (only selected countries are shown) (p. 40).
- Between 1999 and 2006, the percentage decline in death rates for CHD and stroke was slightly greater for whites than for blacks (p. 41).
- In 2006, an estimated 80 million persons in the United States had some form of CVD, 73.6 million had hypertension, and 16.8 million had CHD (p. 45).
- Since the 1960s, there has been a substantial reduction in the prevalence of CVD risk factors: hypertension, smoking, and high cholesterol, but not overweight. The large decline in prevalence of hypertension from 1976–1980 to 1988–1994 was followed by a slightly higher prevalence in 2001–2004 and 2005–2006 (p. 46).
- Between 1976–1980 and 2005–2006, the percentage of persons with hypertension who were aware of their condition, on treatment for it, and having their blood pressure under control increased substantially (p. 47).
- A 2005–2006 national survey showed only about 45 percent of hypertensive patients (systolic BP $\geq$ 140 mmHg or diastolic BP $\geq$ 90 mmHg or on antihypertensive medication) had their condition under control (p. 47).
- Hospitalization rates for heart failure increased between 1971 and 2006 (p. 48).
- The estimated economic cost of CVD for 2009 is approximately $475 billion:
  - $313 billion in direct health expenditures
  - $39 billion in indirect cost of morbidity
  - $122 billion in indirect cost of mortality (p. 49).

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 241,000 deaths in 2005 (p. 33).
- COPD caused 127,000 deaths in 2005 and is the fourth leading cause of death (pp. 34, 36).
- Between 1999 and 2006, death rates for COPD and asthma decreased in both black and white men and women, with one exception: the COPD death rate increased slightly in white women (p. 41).
- Between 1980 and 2006, infant death rates for various lung diseases declined markedly (p. 41).
- Of the 10 leading causes of infant mortality, 4 are lung diseases or have a lung disease component (p. 42). Between 1996 and 2006, changes in mortality for the causes were:
  - Congenital anomalies (-10 percent)
  - Disorders of short gestation (2 percent)
  - Sudden infant death syndrome (-39 percent)
  - Respiratory distress syndrome (-42 percent).
- About one in five deaths in children under 1 year of age is due to a lung disease (p. 42).
- Between 1980 and 2005, the COPD death rate for women in the United States increased significantly compared with the rates in several other countries (p. 43).
- Between 1985 and 2005, death rates for COPD increased for women in all racial/ethnic groups except Asian. For men, the rates decreased in all racial/ethnic groups except American Indians (p. 44).
- Among the sleep disorders, sleep apnea is increasingly being recognized as an important health problem, which can lead to serious consequences. From 1990 to 2005, physician office visits for sleep apnea increased from 108,000 to 3.4 million (p. 44).
- Asthma is a common chronic condition, particularly in children (pp. 45, 46, 48).
- The economic cost of lung diseases is expected to be $177 billion in 2009—$114 billion in direct health expenditures and $64 billion in indirect cost of morbidity and mortality (p. 49).

Blood Diseases

- An estimated 214,000 deaths, 9 percent of all deaths, were attributed to blood diseases in 2005 (p. 33). These include the following:
  - 204,000 due to blood-clotting disorders
  - 10,000 to diseases of the red blood cell and bleeding disorders (p. 34).
- A large proportion of deaths from AMI and cerebrovascular disease involve blood-clotting problems (p. 34).
- In 2009, blood-clotting disorders are expected to cost the Nation's economy $111 billion, and other blood diseases will cost $15 billion (p. 49).

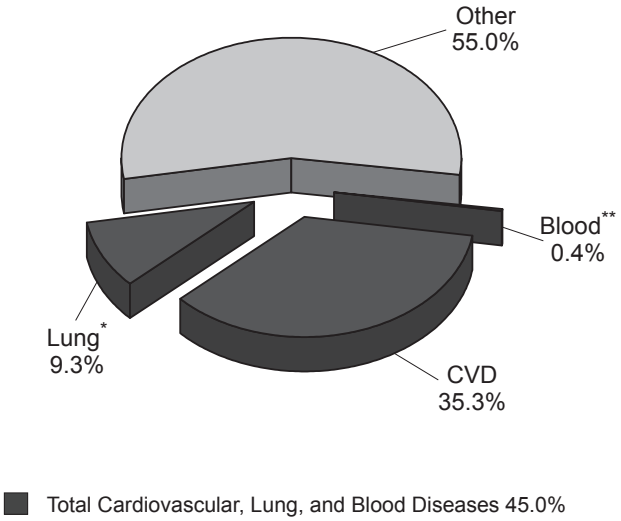
Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1985 and 2005

	1985		2005	
Cause of Death	**Number of Deaths**	**Percent of Total**	**Number of Deaths**	**Percent of Total**
All Causes	2,086,000	100	2,448,000	100
All Cardiovascular, Lung, and Blood Diseases	1,171,000	56	1,101,000	45
Cardiovascular Diseases	988,000	47	864,000	35
Blood	314,000*	15	214,000**	9
Lung	187,000†	9	241,324‡	10
All Other Causes	916,000	44	1,347,000	55

* Includes 306,000 CVD deaths involving blood-clotting diseases.
** Includes 204,000 CVD deaths involving blood-clotting diseases.
† Includes 12,000 CVD deaths due to pulmonary heart disease.
‡ Includes 14,000 CVD deaths due to pulmonary heart disease.

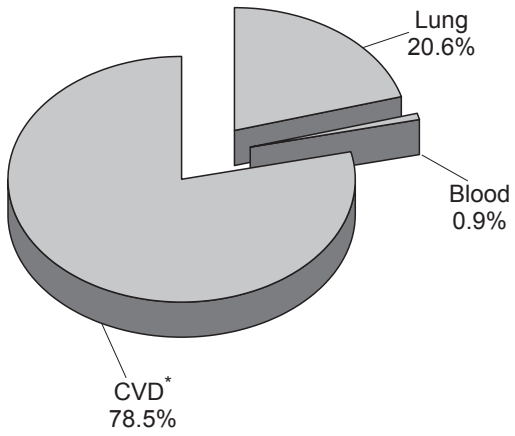
Source: Vital Statistics of the United States, National Center for Health Statistics (NCHS).

Deaths by Major Causes, U.S., 2005



* Excludes 14,000 deaths from pulmonary heart disease (0.6%).
** Excludes 204,000 deaths from blood-clotting disorders (8.3%).

Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2005



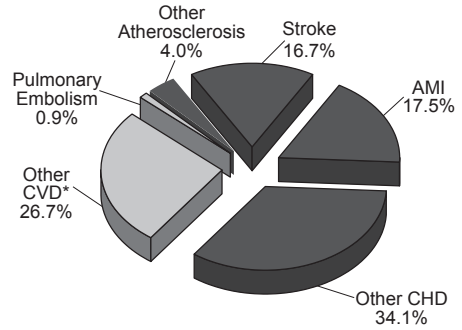
* CVD involving blood clotting (23.6%).

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2005

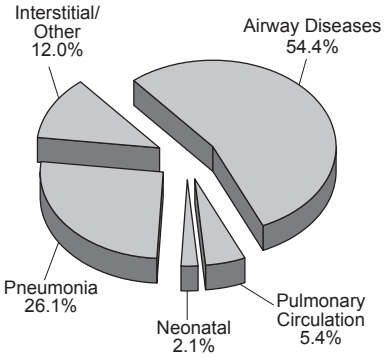
	Deaths (Thousands)		
Cause of Death	**Cardiovascular**	**Lung**	**Blood**
Acute Myocardial Infarction	151	—	103*
Other Coronary Heart Disease	295	—	—
Cerebrovascular Diseases (Stroke)	144	—	89*
Other Atherosclerosis	35	—	4*
Pulmonary Embolism	8	8*	8*
Other Cardiovascular Diseases	231	5*	—
Bleeding and Red Blood Cell Diseases	—	—	10
Chronic Obstructive Pulmonary Disease**	—	127	—
Asthma	—	4	—
Other Airway Diseases	—	—	—
Pneumonia	—	63	—
Neonatal Pulmonary Disorders	—	5	—
Interstitial Lung Diseases	—	6	—
Lung Diseases Due to External Agents	—	18	—
Other Lung Diseases	—	5	—
Total	**864**	**241**	**214**

* Deaths from clotting or pulmonary disorders also are included as cardiovascular deaths.
** This term is preferred to the equivalent term "chronic lower respiratory diseases" given in the 10th revision of the International Classification of Diseases (ICD).
Note: Total, excluding overlap, is 1,101,000.
Source: Vital Statistics of the United States, NCHS.

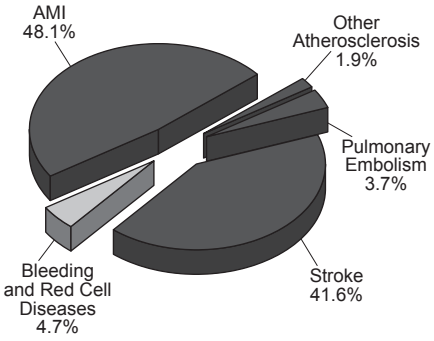
Deaths From Cardiovascular Diseases, U.S., 2005



Deaths From Lung Diseases, U.S., 2005



Deaths From Blood Diseases, U.S., 2005

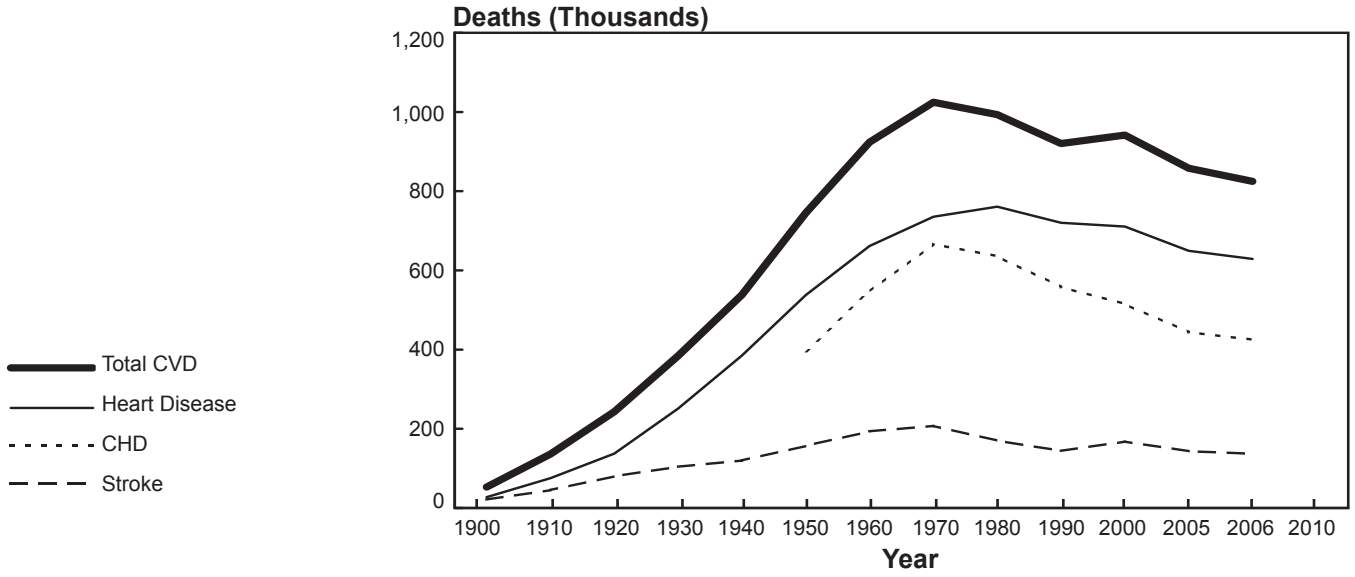


Atherosclerosis-related disease 72.3%

Blood clotting disorders 95.3%

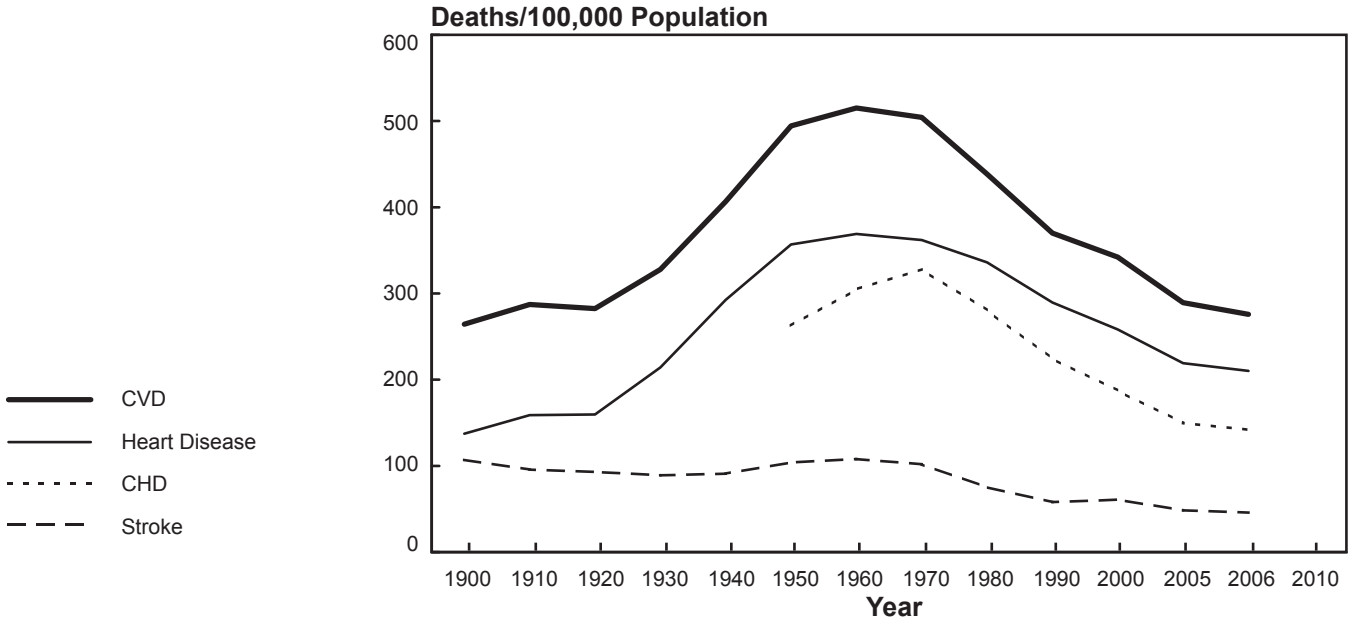
* Includes cardiac dysrhythmias, hypertensive disease, and other heart and blood vessel diseases.
Note: Numbers may not sum to 100 percent due to rounding.
Source: Estimated by the NHLBI from Vital Statistics of the United States, NCHS.

Deaths From Cardiovascular Diseases, U.S., 1900–2006*



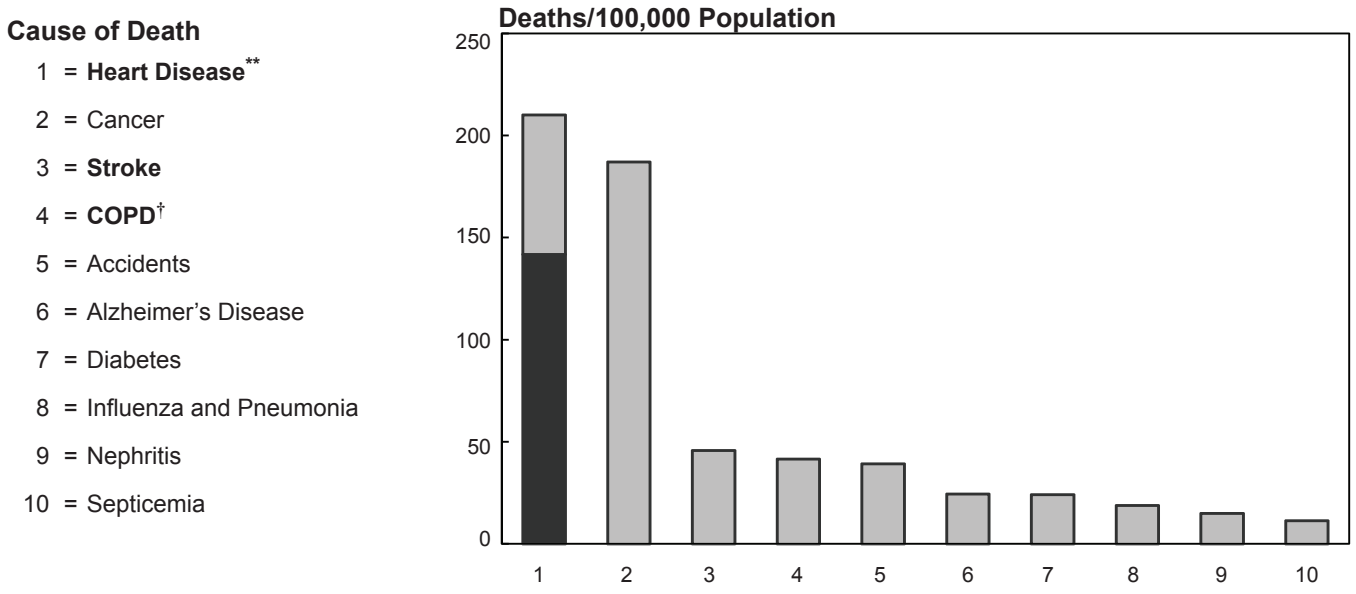
* Data for 2006 are preliminary.
Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular Diseases, U.S., 1900–2006**



* Not age-adjusted.
** Data for 2006 are preliminary.
Source: Vital Statistics of the United States, NCHS.

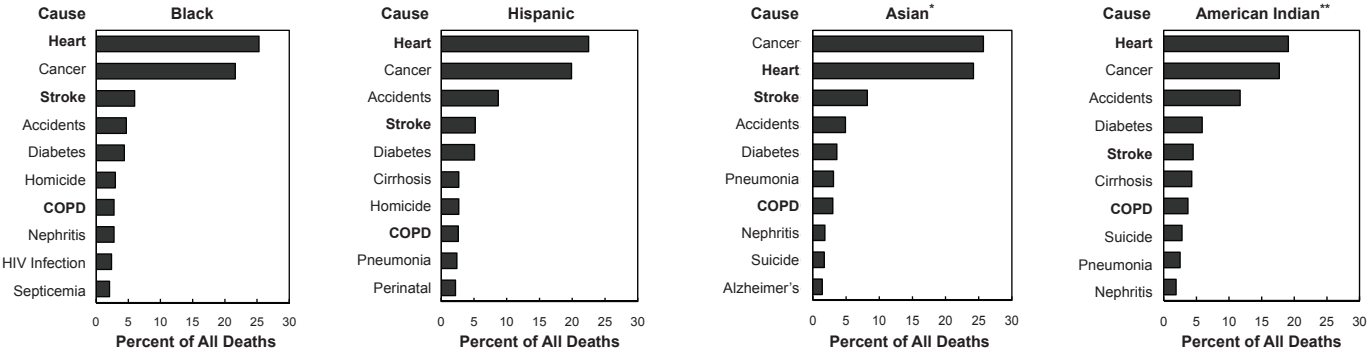
Ten Leading Causes of Death: Death Rates, U.S., 2006*



Years of potential life lost (millions)‡	3.4	4.9	0.6	0.6	3.3	<0.1	0.6	0.2	0.2	0.3

* Data for 2006 are preliminary.
** Includes 141.9 deaths per 100,000 population from CHD.
† COPD and allied conditions (including asthma); the term in the ICD/10 is "chronic lower respiratory diseases."
‡ Based on the average remaining years of life up to age 77 years.
Note: Diseases shown in bold are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Death Among Minority Groups, U.S., 2005



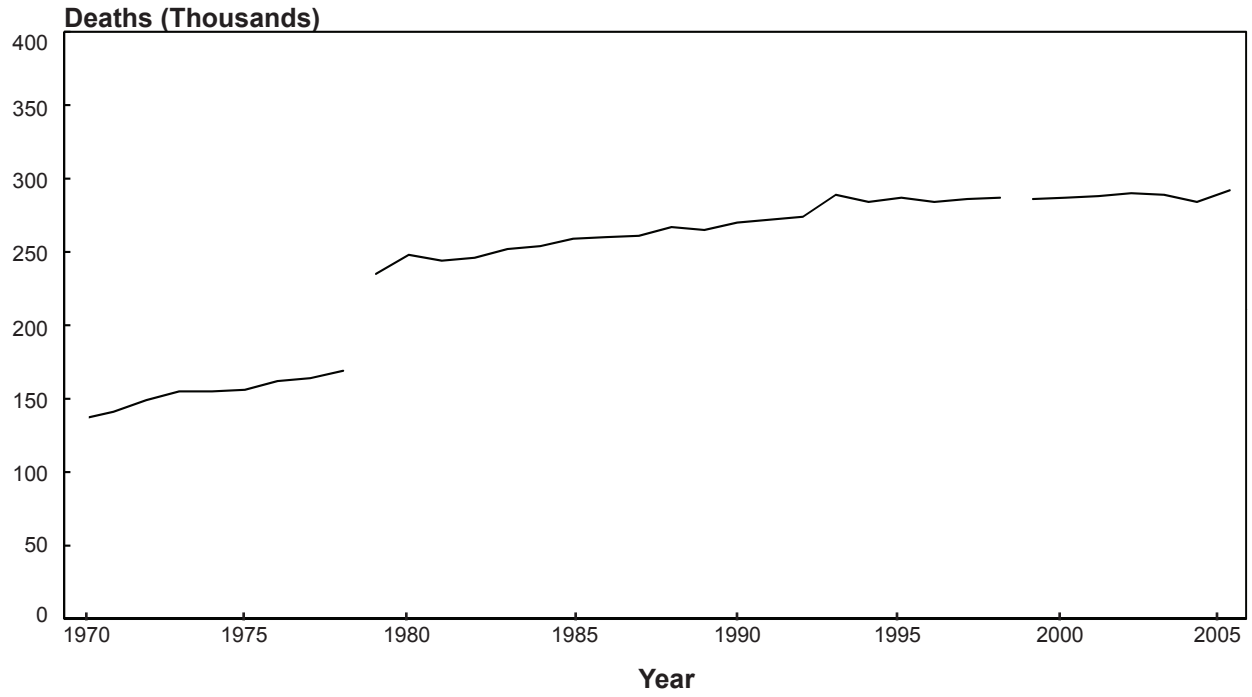
* Includes deaths among individuals of Asian extraction and Asian-Pacific Islanders.
** Includes deaths among Aleuts and Eskimos.
Note: Causes of death shown in bold are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1963, 1986, and 2006*

Cause of Death	Deaths/100,000 Population 1963	1986	2006	Percent Change 1963–2006	Percent Change 1986–2006
All Causes	1,346	979	776	-42	-21
Cardiovascular Diseases	805	466	262	-67	-44
Coronary Heart Disease	478	248	135	-72	-46
Stroke	174	77**	44	-75	-43
Other	153	142	83	-46	-41
Noncardiovascular Diseases	541	512	515	-5	1
COPD and Asthma	16	35†	40	145	16
Other	524	477	474	-10	-1

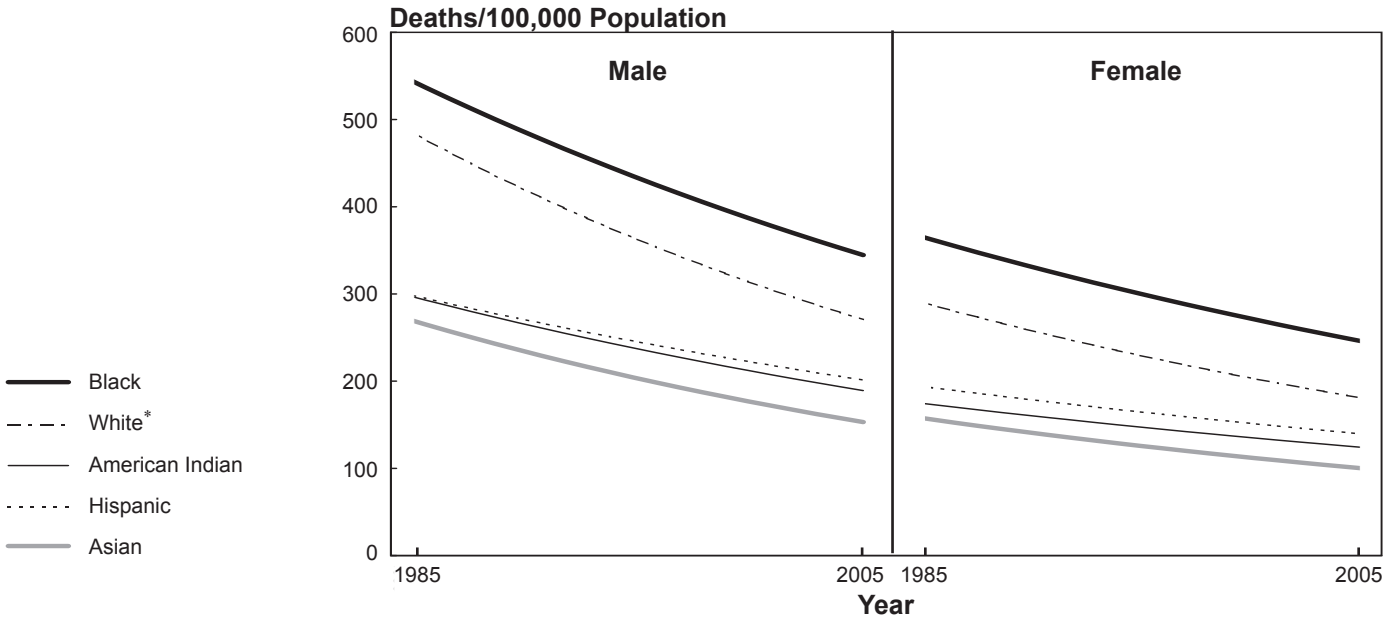
* Data for 2006 are preliminary.
** Comparability ratio (1.0502) applied.
† Comparability ratio (1.0411) applied.
Source: Vital Statistics of the United States, NCHS.

Deaths Attributed to Heart Failure,* U.S., 1970–2005



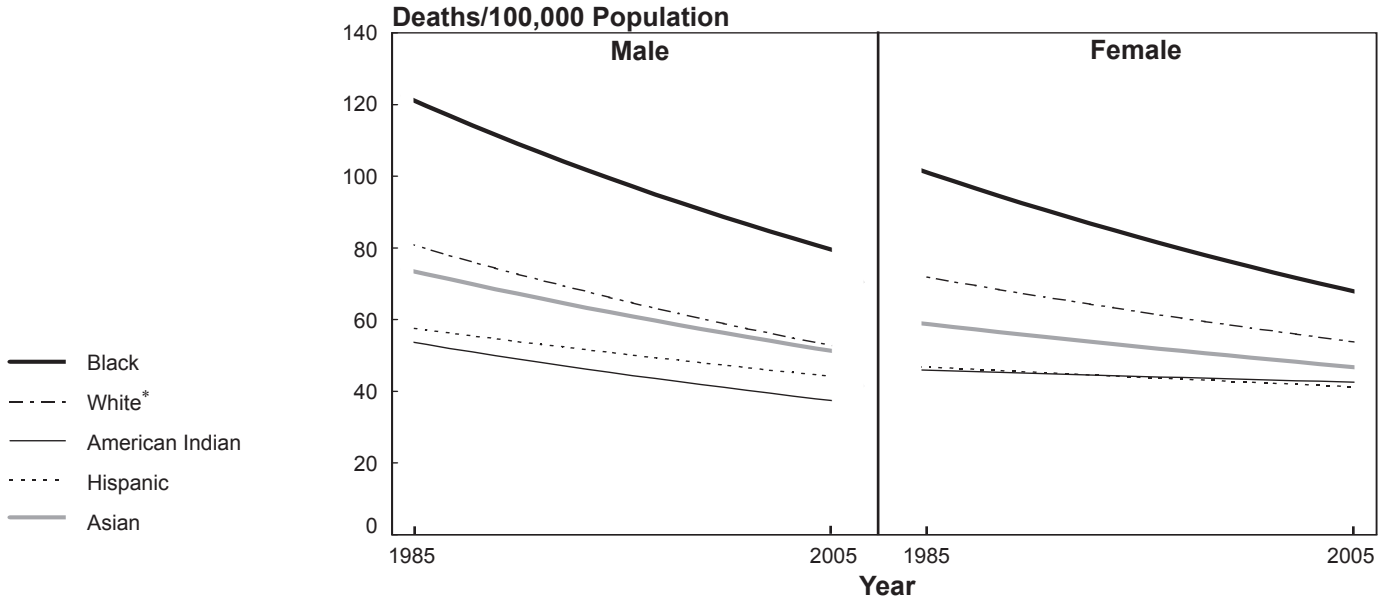
* Heart failure as the underlying or contributing cause of death.
Note: Breaks in trend line indicate change in ICD codes.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Heart Disease by Race/Ethnicity and Sex, U.S., 1985–2005



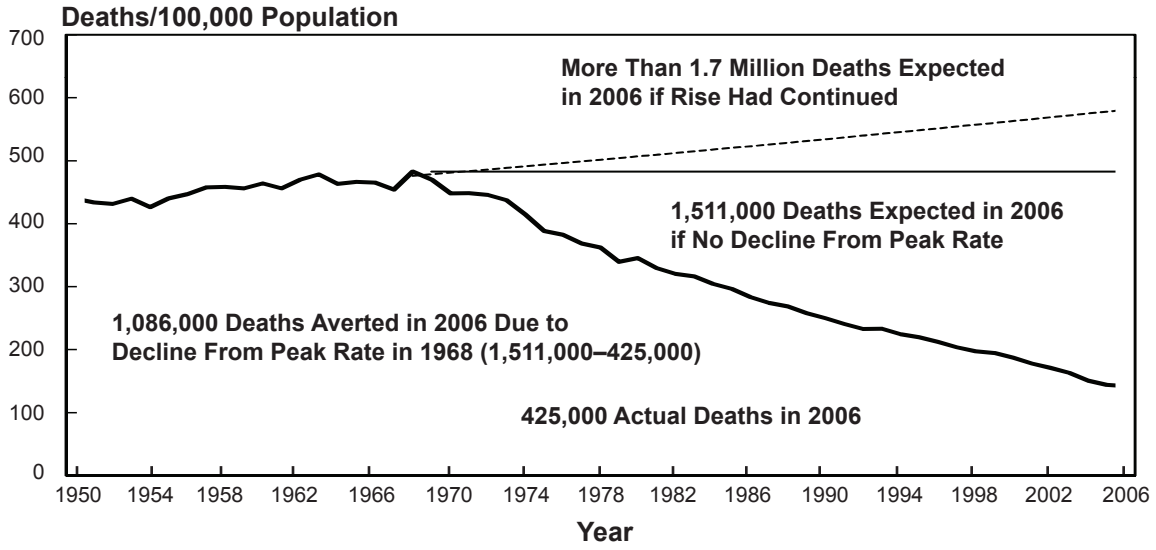
* Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Stroke by Race/Ethnicity and Sex, U.S., 1985–2005



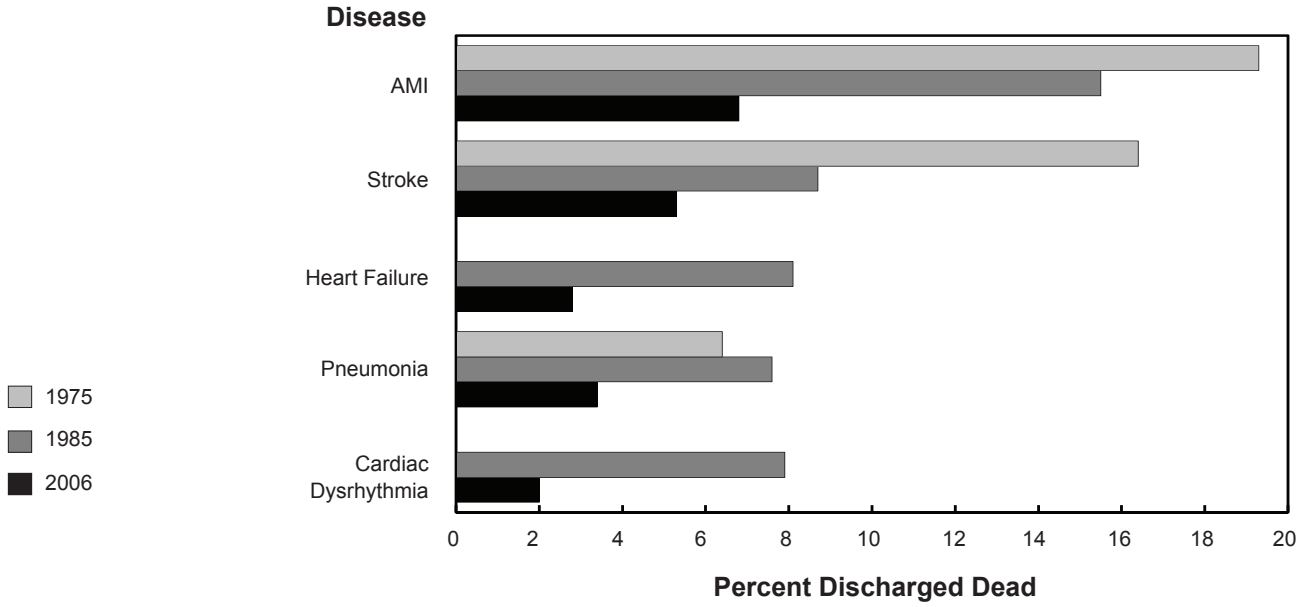
* Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Coronary Heart Disease, U.S., 1950–2006*
Actual Rate and Expected Rates if Rise Had Continued or Reached a Plateau



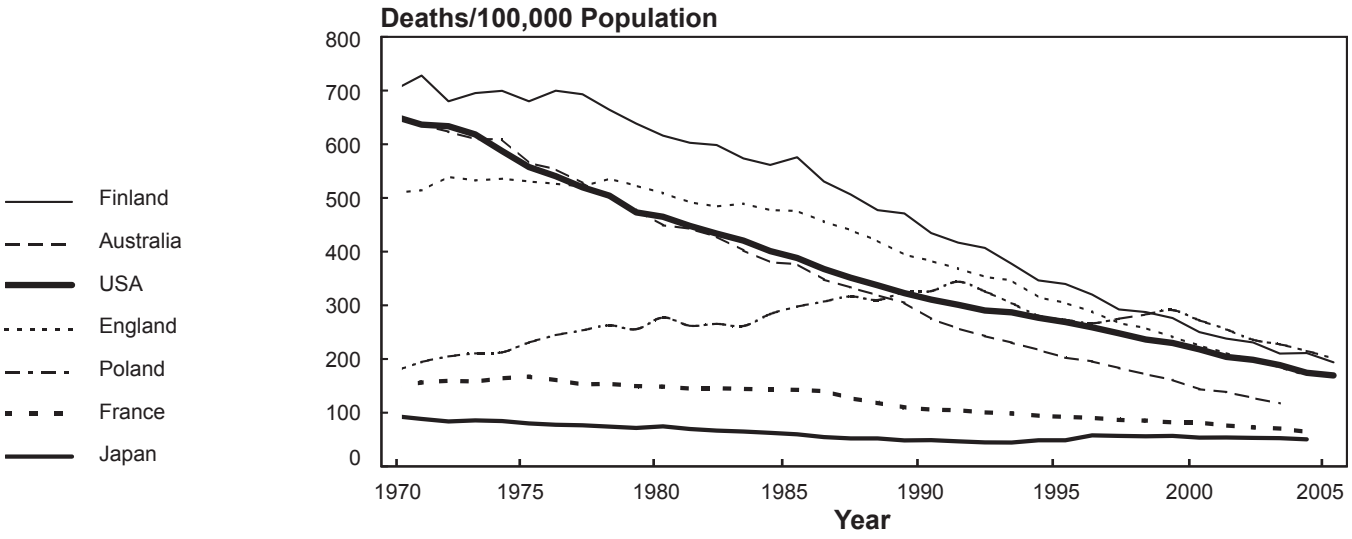
* Data for 2006 are preliminary.
Source: Vital Statistics of the United States, NCHS.

Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 2006



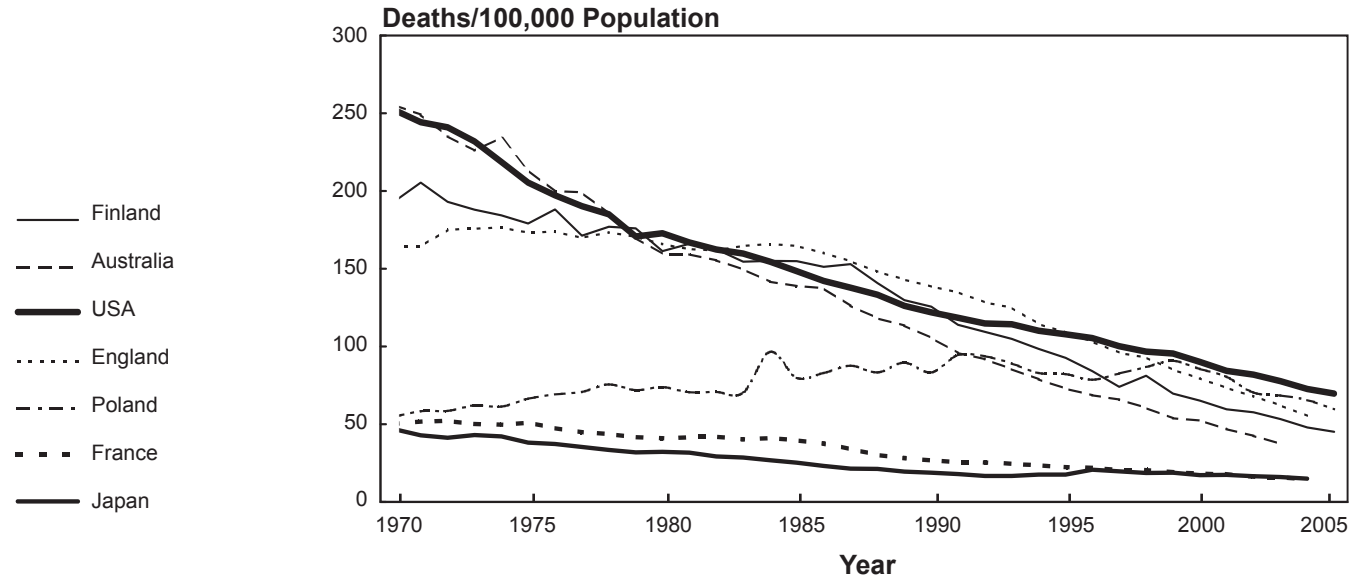
Source: National Hospital Discharge Survey, NCHS.

Death Rates* for Coronary Heart Disease in Men, Ages 35–74, in Selected Countries, 1970–2005



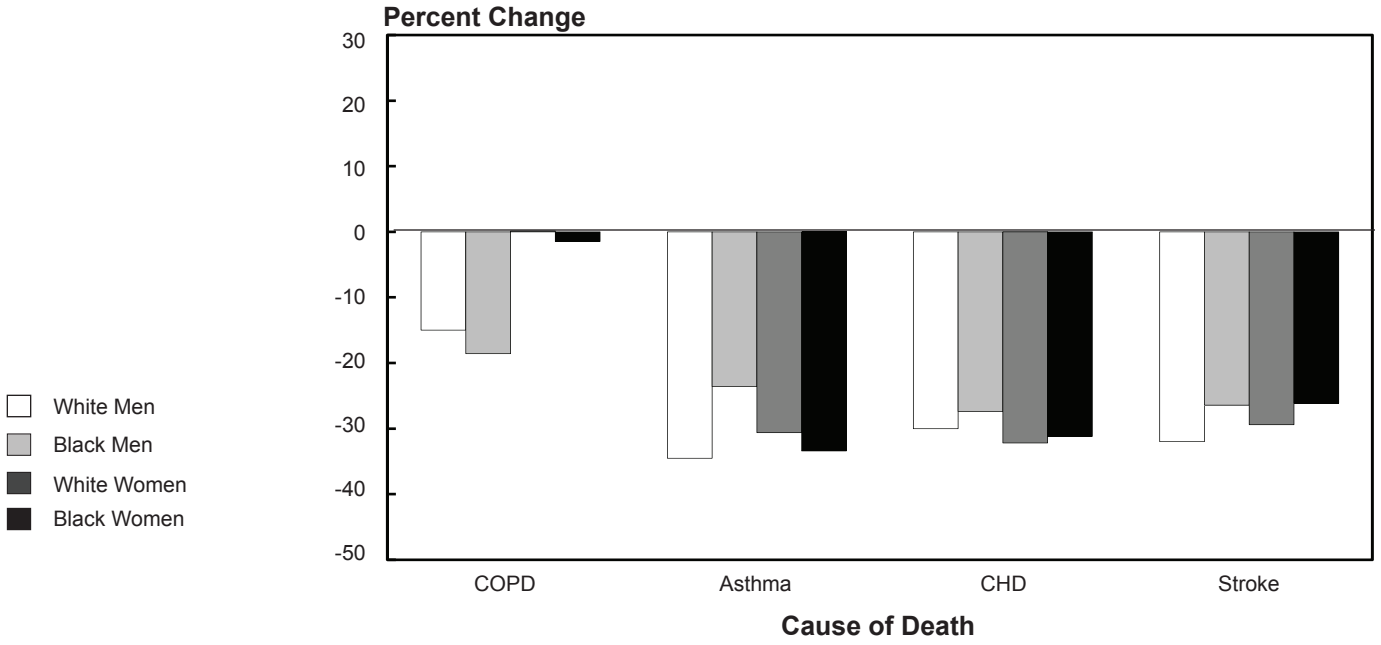
* Age adjusted to the European Standard Population.
Source: World Heath Statistics Annual, World Health Organization (WHO).

Death Rates* for Coronary Heart Disease in Women, Ages 35–74, in Selected Countries, 1970–2005



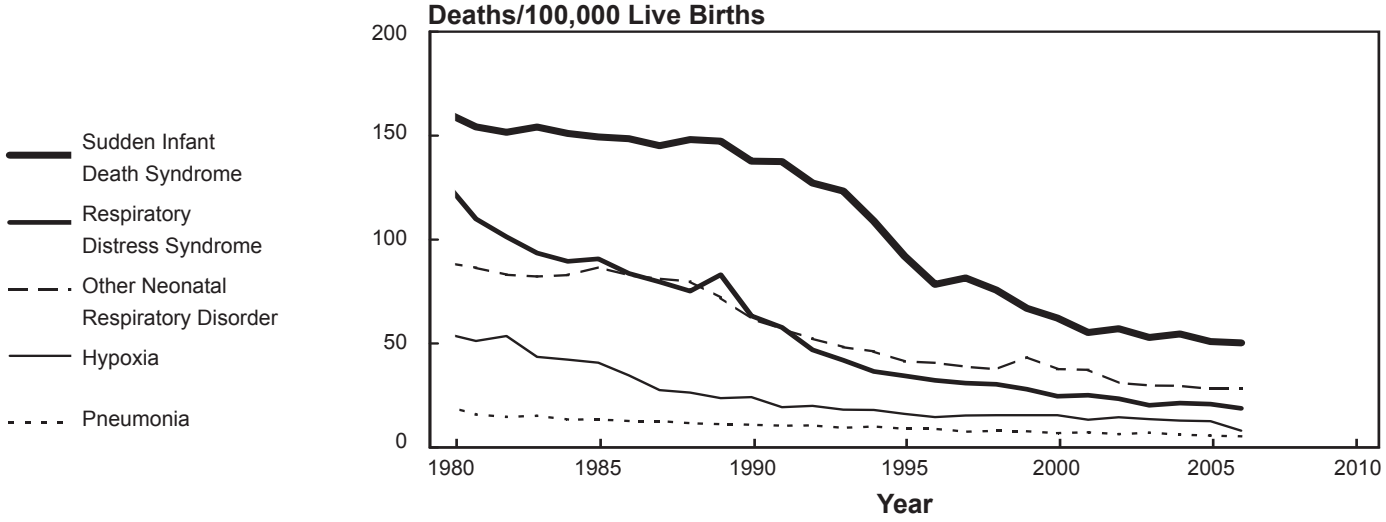
* Age adjusted to the European Standard Population.
Source: World Heath Statistics Annual, WHO.

Percent Change in Age-Adjusted Death Rates for Selected Causes by Race and Sex, U.S., 1999–2006*



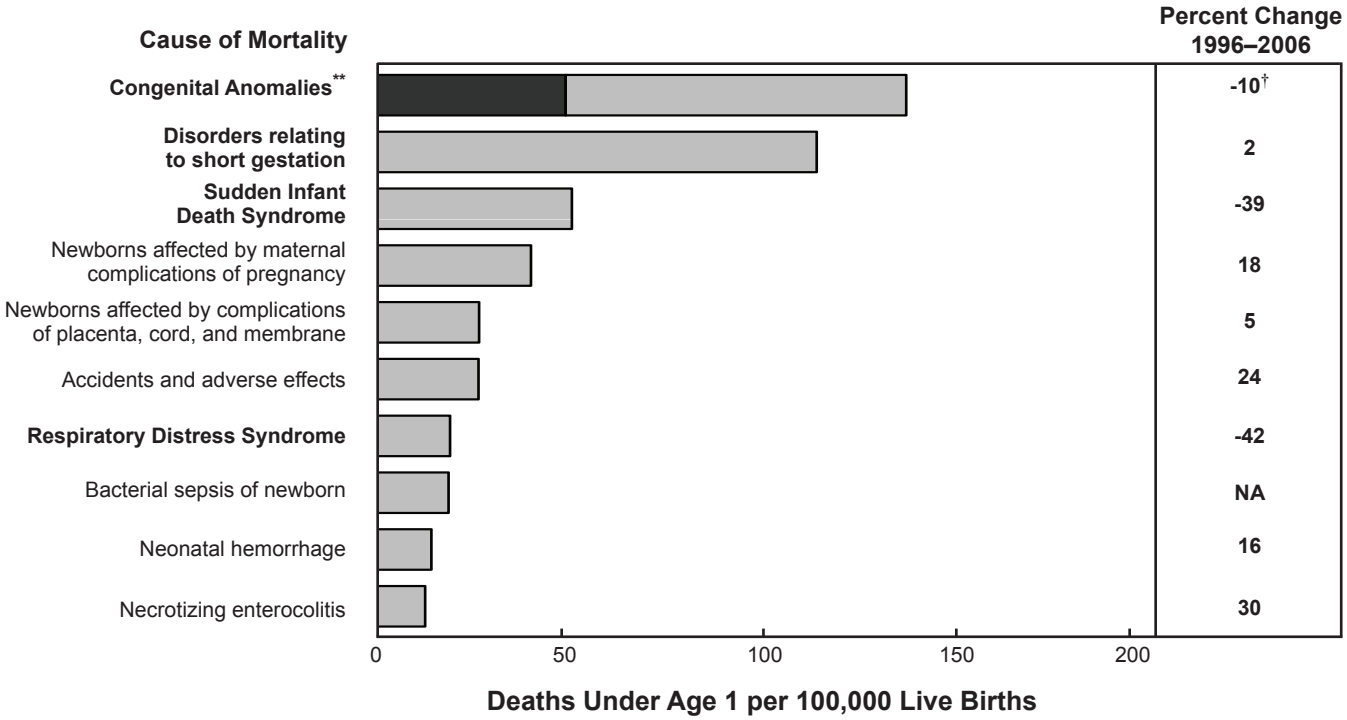
* Data for 2006 are preliminary.
Source: Vital Statistics of the United States, NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1980–2006*



* Data for 2006 are preliminary.
Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Infant Mortality, U.S., 2006*

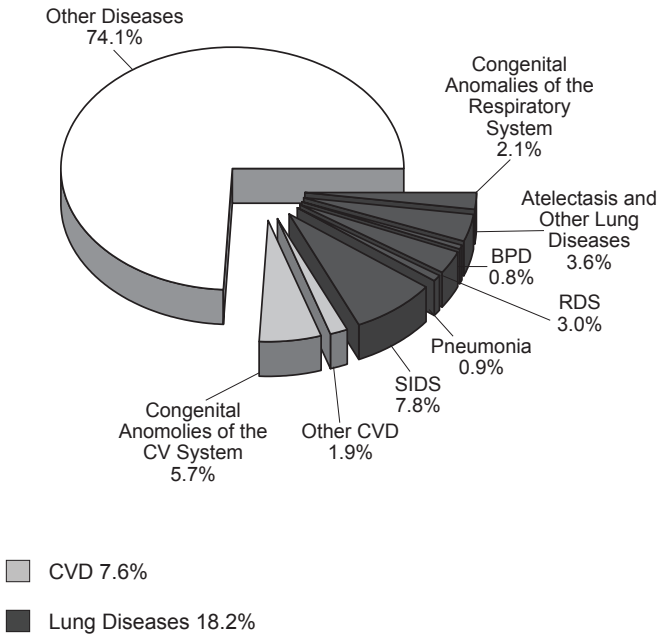


* Data for 2006 are preliminary.
** Congenital CVD and congenital respiratory diseases accounted for 48.7 deaths under age 1 per 100,000 live births (black bar), which is 36 percent of infant deaths due to all congenital anomalies.
† Between 1996 and 2006, congenital CVD declined 32 percent; congenital anomalies of the respiratory system declined 36 percent; other congenital anomalies increased 10 percent.
NA: Not available.
Note: Diseases shown in bold are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

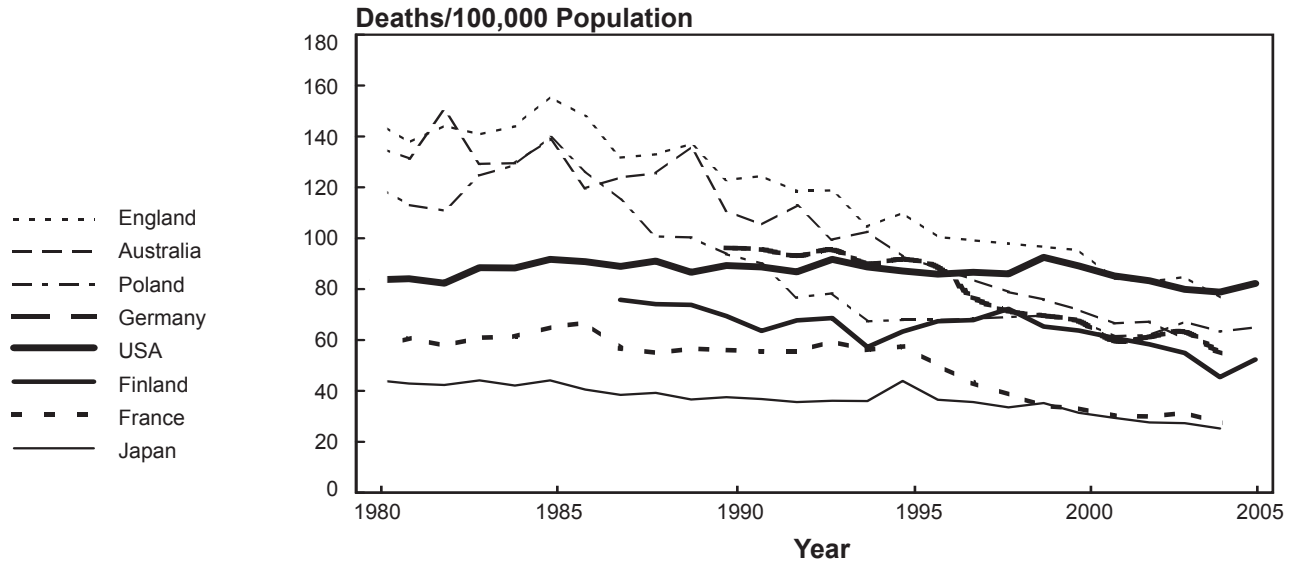
Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2005

Cause of Death	Deaths Under Age 1
All Causes	28,440
Cardiovascular Diseases	**2,151**
Congenital Anomalies	1,622
Other	529
Lung Diseases	5,213
Sudden Infant Death Syndrome	**2,230**
Respiratory Distress Syndrome	**860**
Pneumonia	265
Bronchopulmonary Dysplasia (BPD)	222
Atelectasis of Newborn	377
Congenital Anomalies	**598**
Other Lung Diseases	661
Other Diseases	21,076

Note: Diseases shown in bold are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

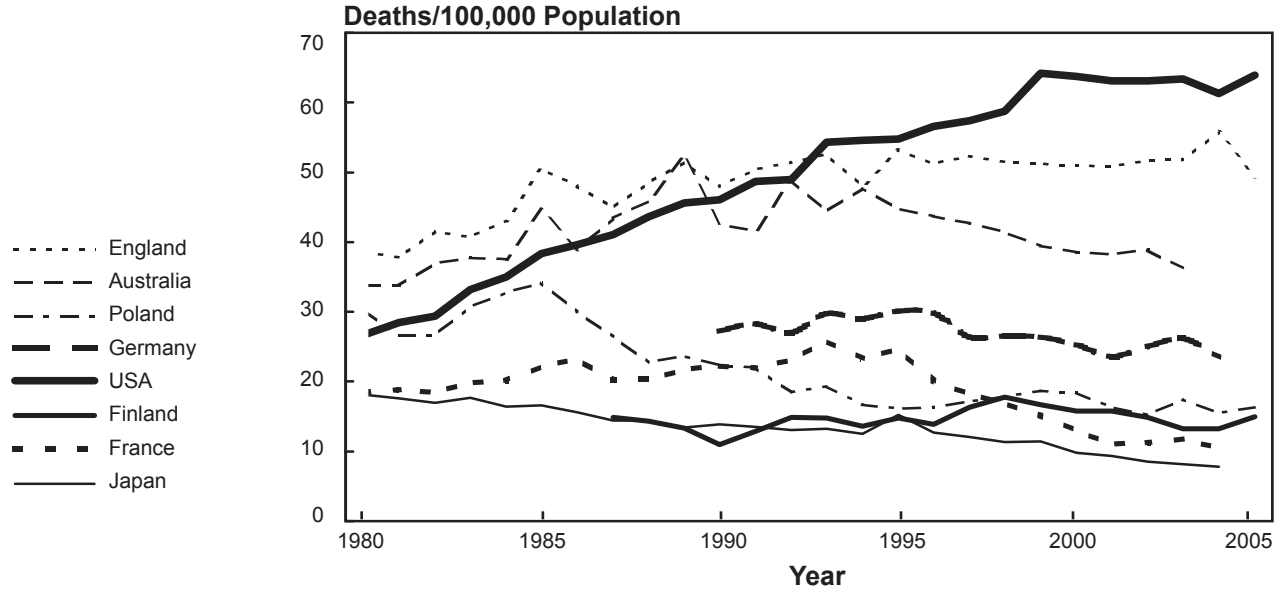


Death Rates* for Chronic Obstructive Pulmonary Disease in Men, Ages 35 and Older, in Selected Countries, 1980–2005



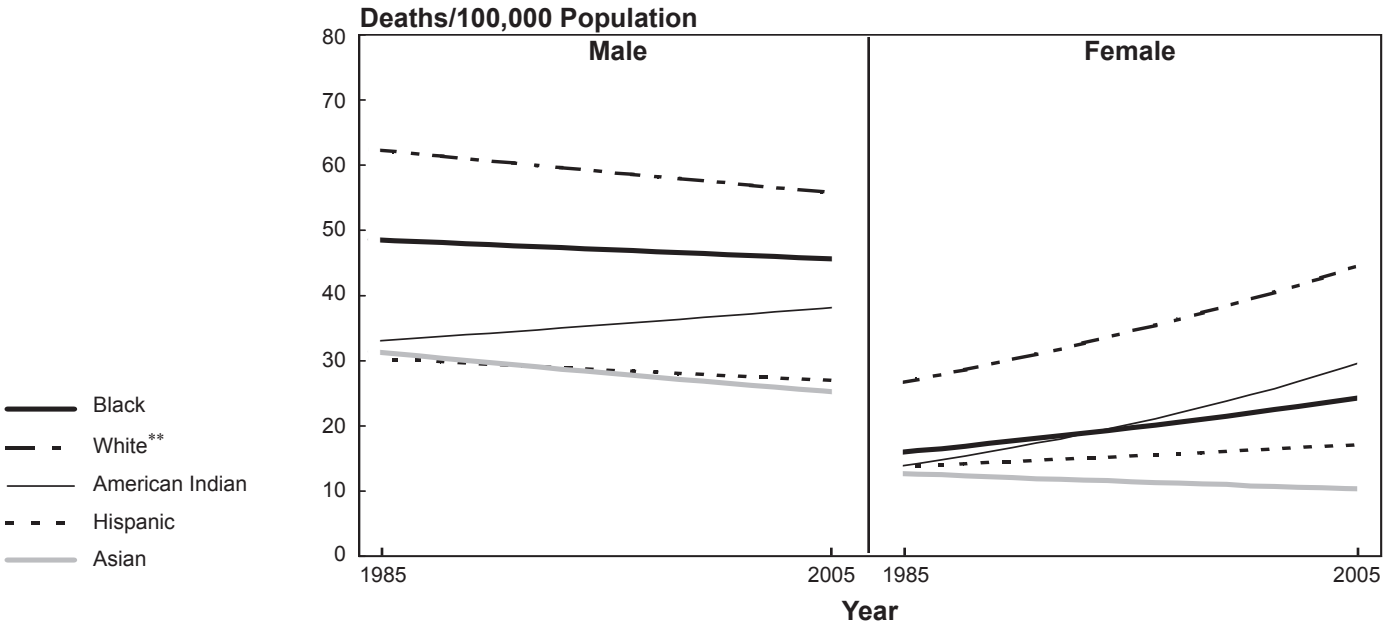
* Age adjusted to the European Standard Population.
Source: World Health Statistics Annual, WHO.

Death Rates* for Chronic Obstructive Pulmonary Disease in Women, Ages 35 and Older, in Selected Countries, 1980–2005



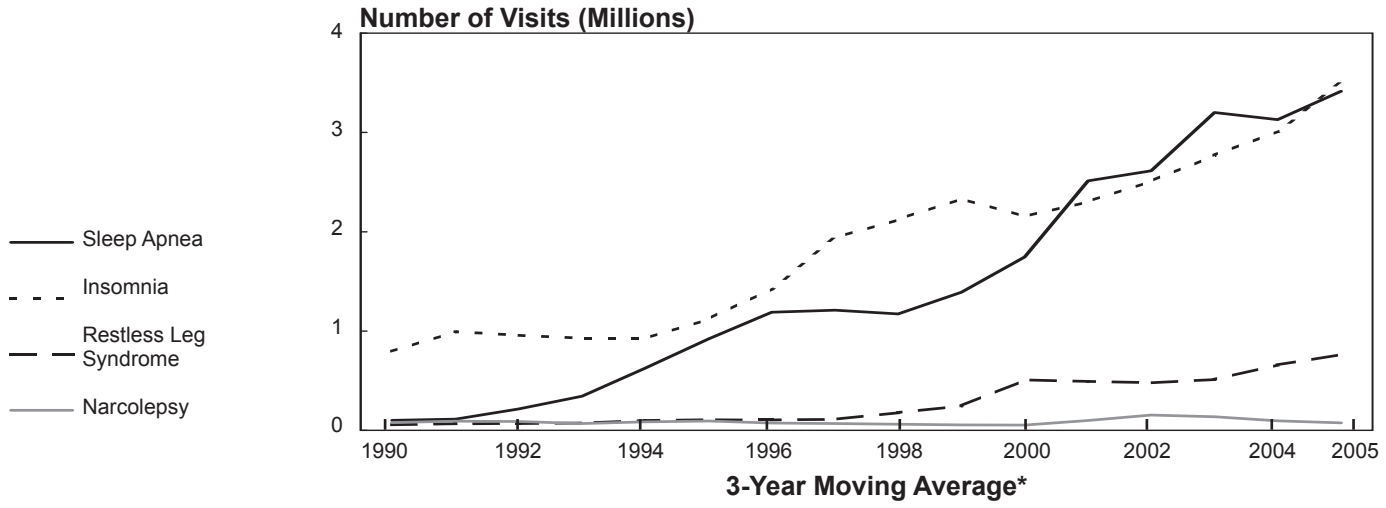
* Age adjusted to the European Standard Population.
Source: World Health Statistics Annual, WHO.

Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease* by Race/Ethnicity and Sex, U.S., 1985–2005



* COPD and allied conditions (including asthma); the term in the ICD/10 is "chronic lower respiratory diseases."
** Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates. Rates from 1985–1998 are modified by the ICD revision comparability ratio.
Source: Vital Statistics of the United States, NCHS.

Physician Office Visits for Sleep Disorders, U.S., 1990–2005



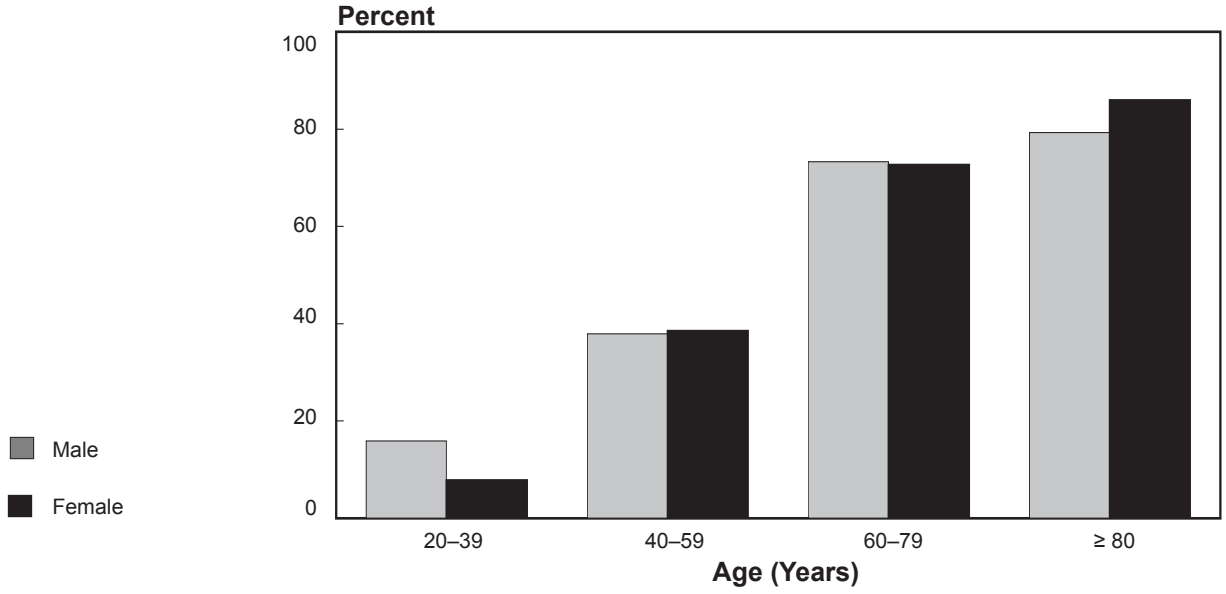
* Represents the average of 3-year visits around the given year.
Note: Primary and secondary diagnoses.
Source: National Ambulatory Medical Care Survey, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases, U.S., 2006

Disease	Number
Cardiovascular Diseases*	80,000,000
Hypertension**	73,600,000
Coronary Heart Disease	16,800,000
Heart Failure	5,700,000
Stroke	6,500,000
Congenital Heart Disease†	1,000,000
Asthma‡	23,000,000
COPD§	24,000,000

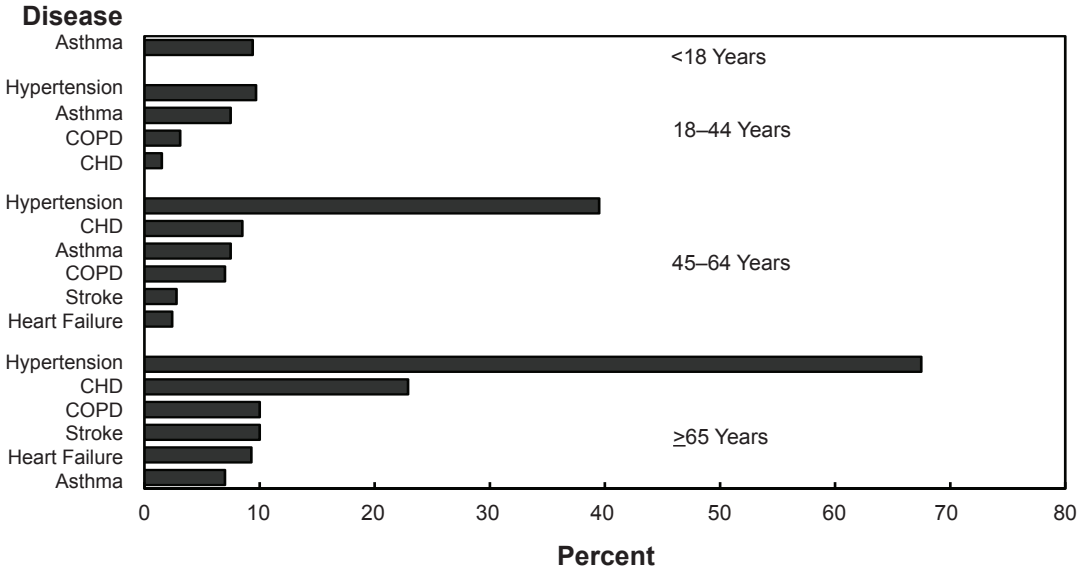
* Includes hypertension, CHD, stroke, or heart failure.
** Hypertension is defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication, or being told twice of having hypertension.
† Range from 650,000 to 1,300,000 (Am Heart J 2004;147:425–439).
‡ 12,300,000 of these had an asthma attack in the past 12 months.
§ An estimated 12,000,000 diagnosed and 12,000,000 undiagnosed.
Sources: National Health and Nutrition Examination Survey (NHANES) of NCHS and National Health Interview Survey (NHIS) of NCHS, except as noted.

Prevalence of Cardiovascular Diseases* in Adults by Age and Sex, U.S., 2005–2006



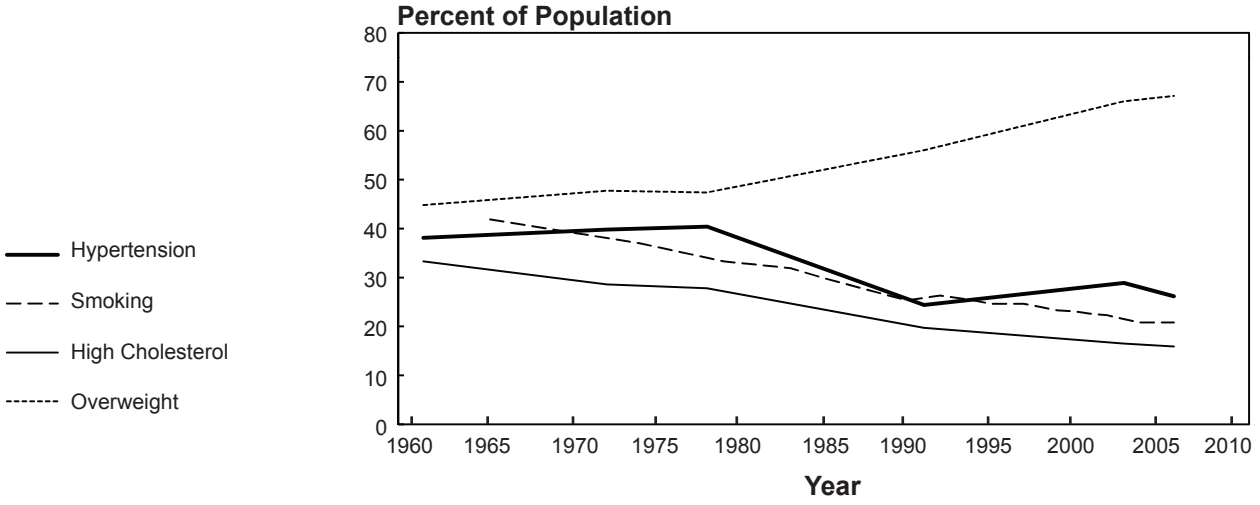
* Hypertension, CHD, stroke, or heart failure. Hypertension is defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication.
Source: NHANES, 2005–2006, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2006



Sources: NHIS and NHANES, NCHS.

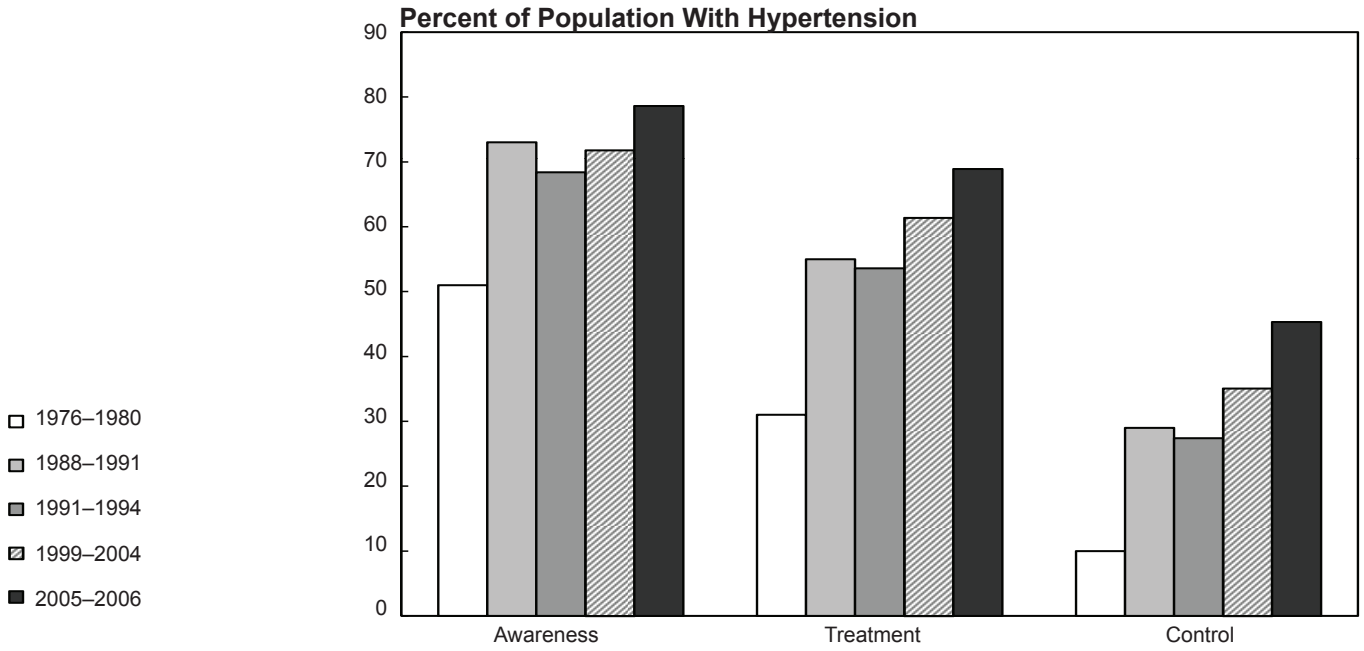
Age-Adjusted Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961–2006



Notes: Hypertension is defined as systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication. High cholesterol is ≥240 mg/dL. Overweight is BMI ≥25 kg/m^3. Data were collected at six time periods: 1960–1961 (plotted at 1961), 1971–1974 (plotted at 1972), 1976–1980 (plotted at 1978), 1988–1994 (plotted at 1991), 1999–2004 (plotted at 2003), and 2005–2006 (plotted at 2006).

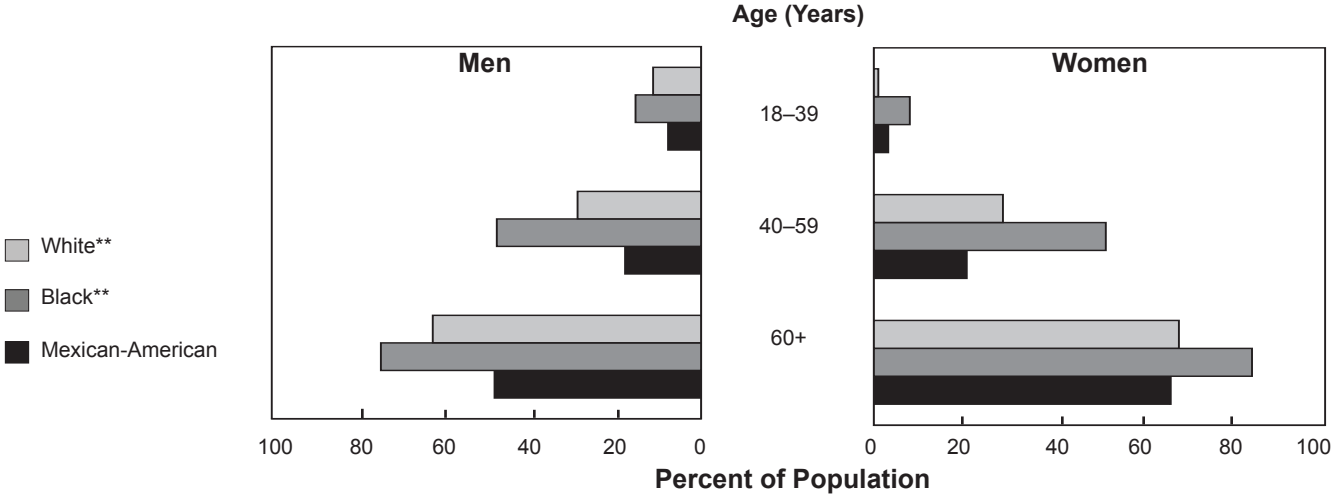
Sources: NHIS for smoking, ages ≥18, NCHS; NHANES for the other risk factors, ages 20–74, NCHS.

Hypertensive* Population Aware, Treated, and Controlled, Ages 18 and Older, U.S., 1976–1980 to 2005–2006



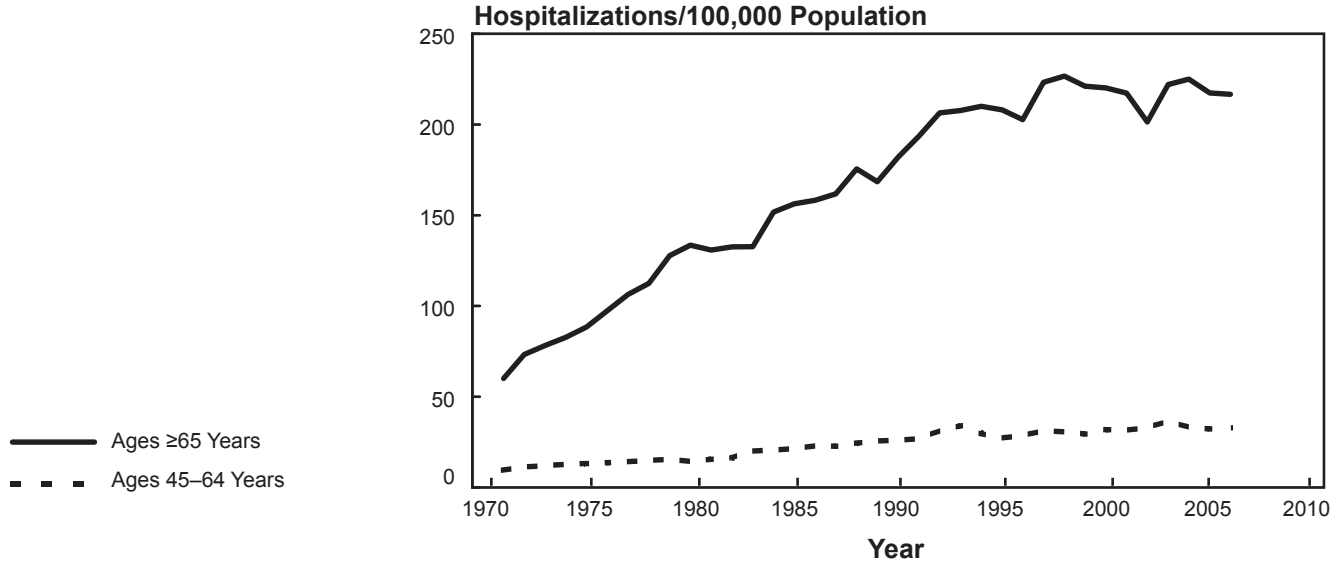
* Hypertension is defined as systolic blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication.
Source: NHANES, NCHS.

Adult Population With Hypertension* by Age, Race/Ethnicity, and Sex, U.S., 2005–2006



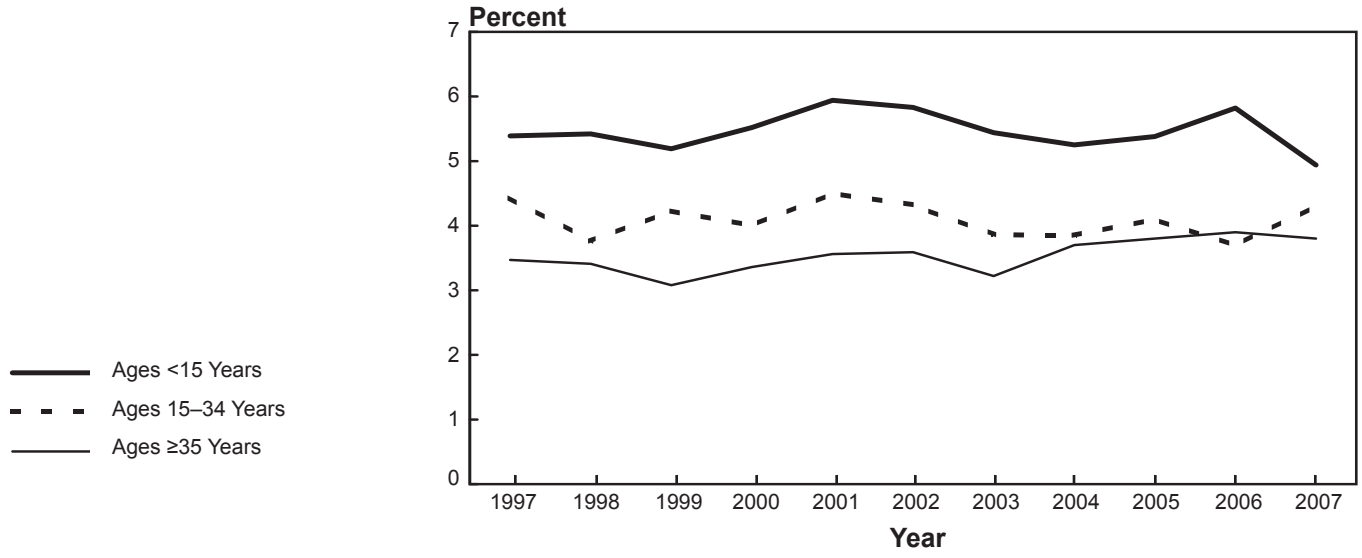
* Hypertension is systolic blood pressure ≥ 140mm Hg, diastolic blood pressure ≥ 90 mmHg, or being on antihypertensive medication.
** Non-Hispanic.
Sources: NHANES, NCHS.

Hospitalization Rates for Heart Failure, Ages 45–64 and 65 and Older, U.S., 1971–2006



Source: National Hospital Discharge Survey, NCHS.

Persons Experiencing Asthma Episodes in Previous 12 Months by Age, U.S., 1997–2007



Source: NHIS, NCHS.

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2009

	Amount (Dollars in Billions)				Percent Distribution			
		Indirect Costs				Indirect Costs		
	Direct Costs*	Morbidity**	Mortality†	Total	Direct Costs	Morbidity	Mortality	Total
Cardiovascular Disease	$313.3	$39.1	$122.4	$474.8	14.7%	17.0%	20.2%	16.0%
(including Blood Clotting)‡	*(73.7)*	*(8.6)*	*(28.5)*	*(110.8)*	*(3.5)*	*(3.7)*	*(4.7)*	*(3.7)*
Lung Diseases§	113.6	30.0	33.8	177.4	5.3	13.0	5.6	6.0
Blood Diseases	11.3	0.7	3.2	15.2	0.5	0.3	0.5	0.5
Subtotal	438.2	69.8	159.4	667.4	20.6	30.3	26.3	22.5
Diseases of the Digestive System	220.8	11.8	27.0	259.6	10.4	5.1	4.5	8.8
Neoplasms	99.0	19.6	124.8	243.4	4.6	8.5	20.6	8.2
Mental Disorders	175.7	30.4	10.5	216.6	8.2	13.2	1.7	7.3
Diseases of the Nervous System	153.3	9.0	14.7	177.0	7.2	3.9	2.4	6.0
Diseases of the Musculoskeletal System	123.3	23.5	3.2	150.0	5.8	10.2	0.5	5.1
Diseases of the Genitourinary System	92.5	6.0	7.5	106.0	4.3	2.6	1.2	3.6
Endocrine, Nutritional, and Metabolic Diseases	85.6	7.5	22.8	115.9	4.0	3.3	3.8	3.9
Infectious and Parasitic Diseases	44.0	14.0	27.3	85.3	2.1	6.1	4.5	2.9
Diseases of the Skin	49.2	1.7	0.7	51.6	2.3	0.7	0.1	1.7
Other and Unallocated to Diseases	649.0	36.9	207.4	893.3	30.5	16.0	34.3	30.1
Total	**2,130.6**	**230.2**	**605.3**	**2,966.1**	**100%**	**100%**	**100%**	**100%**

* Direct costs are personal health care expenditures for hospital and nursing home care, drugs, home care, and physician and other professional services. The estimation method is based on Centers for Medicare & Medicaid Services (CMS) projections for total 2009 health expenditures by type of direct costs and NCHS estimates of direct costs in 1995 for each of the major diagnostic groups. The proportion of costs for 1995 for each diagnostic group is applied to the equivalent 2009 total by type of direct cost.

** Morbidity costs were estimated for 2009 by multiplying NCHS estimates for 1980 by a 1980–2009 percent inflation factor derived from the increase in mean earnings estimated by the Bureau of the Census.

† The mortality cost for each disease group was estimated for 2009 by first multiplying the number of deaths in 2005 in each age- and sex-specific group by the 2004 present value of lifetime earnings (latest available) discounted at 3 percent; second, summing these estimates for each diagnostic group; and third, multiplying the estimates by a 2004–2009 inflation factor (1.138) based on change in mean earnings.

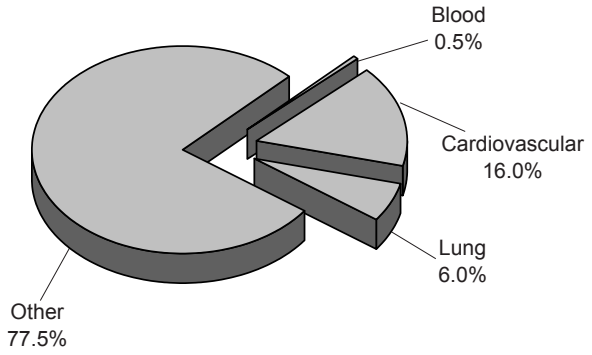
‡ Costs of blood-clotting disease are estimated from predetermined proportions of CVD morbidity and mortality statistics for MI, cerebrovascular diseases, and diseases of arteries.

§ Does not include lung cancer or leukemia.

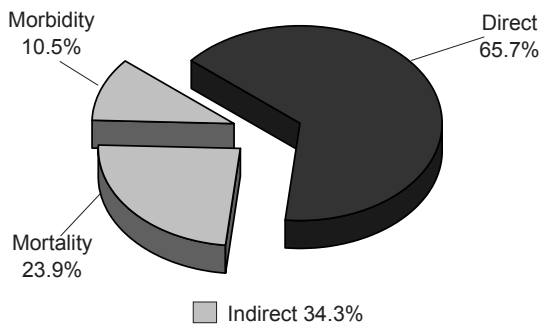
Note: Numbers may not add to totals due to rounding.

Source: Estimates by NHLBI; data from the NCHS, the CMS, the Bureau of the Census, and the Institute for Health and Aging, University of California.

Total Economic Costs, U.S., 2009



Economic Costs of Cardiovascular, Lung, and Blood Diseases, U.S., 2009



5. Institute-Initiated Programs Starting in FY 2008

More than two-thirds of the research supported by the NHLBI is initiated by individual investigators; the remainder is initiated by the Institute. Institute-initiated programs are developed in response to evolving national needs, Congressional mandates, and advances in scientific knowledge. Each initiative represents the outcome of extensive discussions and thorough reviews by representatives of the scientific community, Institute advisory committees, the Board of Extramural Experts (BEE), and the National Heart, Lung, and Blood Advisory Council (NHLBAC). The advisory committees and the BEE, together with professional societies and NHLBI staff, continually review the progress of research within the NHLBI program areas, assess newly acquired knowledge, and identify research topics that offer the best opportunities or constitute the greatest needs. This planning process contributes to policy development at the national level by setting priorities among programs and establishing budgets for individual programs and projects.

Initiatives generally emanate as Requests for Applications (RFAs) for grants, including cooperative agreements, or Requests for Proposals (RFPs) for contracts. Other initiatives take the form of Program Announcements (PAs). Applications and proposals submitted in response to RFAs and RFPs compete among themselves for specific "set-aside" funds. Applications submitted in response to PAs generally compete with other investigator-initiated applications for funding.

RFA, RFP, and PA concepts prepared by the Institute are presented to the BEE, which reviews and prioritizes them. The concepts, along with the comments from the BEE, are then sent to the NHLBAC for review, comment, and concurrence. Initiatives that receive the concurrence of the NHLBAC are considered further by the NHLBI Director in the context of the Institute's budget, program priorities, review workload, and proposed mechanisms. These considerations guide the Director's subsequent decisions to approve initiatives for release. RFAs, RFPs, and PAs are announced in the *NIH Guide to Grants and Contracts*.

Applications and proposals submitted in response to RFAs and RFPs are reviewed by the NHLBI. Applications submitted in response to PAs are reviewed by the NIH Center for Scientific Review.

Descriptions of the Institute-initiated programs that began or were renewed (i.e., were funded) in FY 2008 are presented below according to NHLBI scientific programs. Also described are trans-NIH, trans-PHS, interagency, and private-public partnership initiatives in which the NHLBI participates.

Heart and Vascular Diseases Program

Initiatives Being Renewed

Cardiovascular Health Study (CHS): Transition Phase

The purpose of this renewal is to maintain the infrastructure that provides access to CHS resources and expertise, scientific collaborations, and mentorship of early-career investigators.

Framingham Heart Study

The purpose of this renewal is to continue support for the Framingham Heart Study in order to increase understanding about the complex influences of genes and environment on development and progression of heart, lung, and blood diseases and sleep disorders.

Multi-Ethnic Study of Atherosclerosis (MESA)

The purpose of this renewal is to capitalize and expand upon the resources of data, samples, and infrastructure of the MESA cohort, which was established to identify factors associated with the progression of subclinical CVD in four major racial/ethnic groups within the U.S. population (white, black, Hispanic, and Chinese).

Women's Health Initiative Memory Study

The purpose of this renewal is to continue to test the effects of hormone therapy on cognitive decline, mild cognitive impairment, and probable dementia in postmenopausal women.

New Initiatives

Mechanisms and Management of Cardiovascular and Metabolic Complications of HIV/AIDS

The purpose of this RFA is to elucidate the underlying mechanisms of metabolic and anthropometric abnormalities in HIV patients receiving highly active antiretroviral therapy and to determine their relationship to CVD risk; to evaluate biomarkers and imaging modalities in the assessment of coronary artery disease and risk; and to identify treatment strategies and interventional approaches to reduce cardiovascular risk while optimizing medical management of HIV infection.

New Approaches in Arrhythmia Detection and Treatment

The purpose of this PA is to develop new or improved methods, tools, and technologies to detect, treat, and prevent cardiac arrhythmias.

Lung Diseases Program

New Initiatives

Molecular Phenotypes for Lung Disease

The purpose of this initiative is to identify molecular phenotypes of major lung diseases that will lead to improved diagnosis, prognosis, and personalized treatment of these diseases.

Protein Interactions Governing Membrane Transport in Pulmonary Health and Disease

The purpose of this PA is to delineate the protein interactions and pathways governing membrane trafficking pathways operative in pulmonary health and disease and develop innovative therapeutic interventions.

Small Grants for Lung Tissue Research

The purpose of this RFA is to conduct tissue-based research on COPD and interstitial fibrotic lung conditions. Scientists will use biospecimens and clinical data collected by the Lung Tissue Research Consortium to study the correlation of lung molecular characteristics with histopathology and presence, severity, and phenotypic manifestations of interstitial lung diseases and COPD.

Blood Diseases and Resources Program

Initiatives Being Renewed

Basic and Translational Research Program

The NHLBI reconfigured the Comprehensive Sickle Cell Centers program to the Basic and Translational Research Program. This program emphasizes fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. It continues to support the Sickle Cell Disease Scholars program for the career development of young investigators and the Summer-for-Sickle Cell-Science program for research training and mentoring of high school students.

Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG) Follow-Up Study

The purpose of this renewal is to follow up for 2 years the infants and toddlers who have sickle cell anemia who participated in the BABY HUG trial to identify toxicities and any persistent effects from treatment with hydroxyurea to prevent chronic organ damage.

Trans-NHLBI

Initiatives Being Renewed

NHLBI Career Transition Award

The purpose of this renewal is to enable highly qualified postdoctoral fellows to obtain research training in the NHLBI Division of Intramural Research and to facilitate their successful transition to an extramural environment as independent researchers.

Short-Term Research Education Program To Increase Diversity in Health-Related Research

The purpose of this renewal is to provide opportunities to students who are from underrepresented racial and ethnic minorities or disadvantaged backgrounds, or who have disabilities to become exposed to biomedical research to stimulate career development in areas relevant to cardiovascular, lung, and blood diseases and sleep disorders.

New Initiatives

Biorepository and Limited Access Data Set Information Coordinating Center

The purpose of this RFP is to establish a Biorepository and Limited Access Data Information Coordinating

Center (BioLINCC), which will be responsible for establishing and maintaining an infrastructure to facilitate and maximize access to the NHLBI Biologic Specimen Repository and Limited Access Data Set programs.

Deep Vein Thrombosis and Venous Disease

The purpose of this RFA is to support collaborative basic and clinical research on deep vein thrombosis and venous thrombotic diseases to improve diagnosis, treatment, and prevention of venous thrombotic diseases.

Elucidating Nature's Solutions to Heart, Lung, and Blood Diseases and Sleep Disorder Processes

The purpose of this PA is to elucidate the natural molecular and cellular adaptations of mammalian species to extreme environmental conditions that would rapidly evoke life-threatening cardiovascular or respiratory responses.

Individual Predoctoral MD/PhD Fellowships

The purpose of this PA is to provide research training to applicants in combined MD/PhD programs who have the potential to become productive, independent physician-scientists in areas relevant to the mission of the NHLBI.

Investigator-Initiated Multi-Site Clinical Trials

The purpose of this PA is to support investigator-initiated multisite (Phase II or Phase III) randomized, controlled clinical trials related to the mission of the NHLBI. The trials may involve clinical or behavioral interventions.

New Approaches to Non-Viral Systems for Gene Transfer Applications for Heart, Lung, and Blood Diseases

The purpose of this PA is to develop efficient non-viral vectors that can overcome limitations of viral vectors for gene therapy clinical trials in heart, lung, and blood diseases.

Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy

The purpose of this RFP is to determine whether use of a genotype-enhanced dosing algorithm to initiate warfarin treatment improves anticoagulation status compared to a dosing algorithm using only clinical information.

Research Demonstration and Dissemination Grants

The purpose of this PA is to test the effectiveness of interventions that are based on strategies designed to promote healthy lifestyles and prevent or ameliorate disease in defined populations and improve delivery of proven efficacious treatment in clinical practice.

Right Heart Function in Health and Chronic Lung Diseases

The purpose of this PA is to stimulate research on cellular, molecular, and physiological determinants of right ventricular function in health and dysfunction in chronic lung diseases. The goal is to gain knowledge that can be used to develop improved methods for preventing, diagnosing, and treating right heart failure.

Trans-NIH

Initiatives Being Renewed

Bioengineering Nanotechnology Initiative

The purpose of this renewal is to develop and apply nanotechnology to biomedicine.

Chronic Fatigue Syndrome: Pathophysiology and Treatment

The purpose of this renewal is to examine the etiology, diagnosis, pathophysiology, and treatment of chronic fatigue syndrome in diverse groups and across the lifespan.

Chronic Illness Self-Management in Children and Adolescents

The purpose of this renewal is to improve the self-management and quality of life of children and adolescents with chronic illnesses. Self-management is intended to enhance individual well-being and strengthen patient participation in health care while reducing inappropriate health care use and health care costs.

Data Resource for Analyzing Blood and Marrow Transplants

The purpose of this renewal is to continue support of the Center for International Blood and Marrow Transplant Research, a resource for data from blood and bone marrow transplant centers throughout the world.

Innovations in Biomedical Computational Science and Technology

The purpose of this renewal is to support fundamental research in biomedical information science and technology and to develop new informatics, computational and mathematical tools, and technologies that can speed progress in biomedical research.

Mind-Body Interactions and Health

The purpose of this renewal is to increase understanding of the processes underlying mind-body interactions and health and to apply the knowledge gained to interventions and clinical practice to promote health and prevent or treat disease and disabilities.

Novel Approaches To Enhance Animal Stem Cell Research

The purpose of this renewal is to enhance the utility of animal stem cells as model biological systems. Researchers will focus on isolation and characterization of embryonic and other multipotent stem cells in a variety of animal species.

Pathogenesis and Treatment of Lymphedema and Lymphatic Diseases

The purpose of this renewal is to stimulate research on the lymphatic system, characterize its function and pathophysiologic mechanisms that cause disease, develop new methods for imaging and quantitating lymph flow, and discover new therapeutic interventions for lymphatic diseases.

Social and Cultural Dimensions of Health

The purpose of this renewal is to encourage the development of health research that integrates knowledge from biomedical and social sciences.

New Initiatives

Advancing Novel Science in Women's Health Research

The purpose of this PA is to support innovative, interdisciplinary research that will develop new concepts in women's health research and the study of gender differences. Researchers are encouraged to examine the role of gender on women's health.

Clinical Trials in Organ Transplantation in Children

The purpose of this RFA is to improve graft acceptance and patient/graft survival in pediatric heart, lung, liver, kidney or intestinal transplant recipients by assessing risk factors, testing novel drug treatments, and developing diagnostic tools.

Collaborations With National Centers for Biomedical Computing

The purpose of this PA is to support investigators working in collaboration with the National Centers for Biomedical Computing (NCBCs) of the NIH Roadmap for Medical Research to build a computational infrastructure for biomedical computing and expand the scope of biological, behavioral, and computational problems currently being addressed by the NCBCs.

Development and Application of New Technologies to Targeted Genome-Wide Resequencing in Well-Phenotyped Populations

The purpose of this RFA is to develop and validate resequencing applications for cost-effective, high-throughput sequencing of every exon of all protein coding genes in the human genome by assembling current and emerging technologies in the areas of DNA target capture and sequencing. The purpose of developing these resequencing applications is to enable the sequencing of thousands of individual DNA samples in well-phenotyped populations in a cost-effective manner.

Exploratory/Developmental Investigations on Primary Immunodeficiency Diseases

The purpose of this PA is to stimulate exploratory/developmental investigations in primary immunodeficiency diseases by supporting research to characterize and determine the molecular basis for the diseases and develop clinical strategies for their diagnosis and treatment.

Improving Diet and Physical Activity Assessment

The purpose of this PA is to improve the quality of measurements of diet and physical activity for use in general and diverse populations through development of better instruments, technologies, and statistical/analytical techniques.

Lymphatic Biology in Health and Disease

The purpose of this PA is to stimulate research to identify developmental, molecular, and cellular mechanisms that contribute to health and disease of the lymphatic system.

Methodology and Measurement in the Behavioral and Social Sciences

The purpose of this PA is to improve the quality and scientific power of data collected in behavioral and social sciences relevant to the missions of the Institute through innovations in research design, data collection techniques, measurement, and data analysis techniques.

Multidisciplinary Translational Research in Critical Care

The purpose of this PA is to promote multidisciplinary translational research that will improve treatment, diagnosis, and outcome of patients with critical illness and increase understanding of fundamental processes causing critical illness.

Sarcoidosis: Research Into the Cause of Multi-Organ Disease and Clinical Strategies for Therapy

The purpose of this PA is to stimulate research on the etiology and management of sarcoidosis, an immune-mediated granulomatous inflammatory disorder, and to delineate possible causes and phenotypic host characteristics in susceptible people so that preventive strategies can be developed, early diagnosis improved, and better therapies devised to lessen initial disease immunopathology.

Trans-PHS

New Initiatives

Small Business Innovation Research Contract Solicitation

The purpose of this SBIR contract solicitation is to encourage scientific and technological innovations in areas identified by the Institute. Specific projects include production of generic modified hemoglobin for research purposes and development of a computational model library of cardiovascular and pulmonary anatomy and related blood and tissue material properties.

Subpopulations and Intermediate Outcome Measures in COPD Study

The purpose of this RFP is to define pathogenetically homogeneous subgroups of COPD subjects on the basis of biomarkers, genotypes, and computed tomography images and to identify intermediate outcome measures for use in future clinical trials.

Interagency

New Initiative

Enabling Technologies for Tissue Engineering and Regenerative Medicine

The purpose of this PA is to develop innovative technologies, tools, methods, and devices that will enhance tissue engineering and regenerative medicine. The overall goal is to engineer functional tissues in vitro for implantation in vivo or to foster tissue regeneration directly in vivo with the purpose of replacing, repairing, preserving, or enhancing organ function lost due to disease, injury, or aging or for use as 3D tissue model systems for drug development.

Private-Public Partnership

New Initiative

Understanding and Treating Ataxia-Telangiectasia

The purpose of this PA is to stimulate multidisciplinary research to improve understanding of and develop treatments for ataxia-telangiectasia.

6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

Chair: Elizabeth G. Nabel, M.D., Director, NHLBI

Executive Secretary: Stephen C. Mockrin, Ph.D., Director, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0260

The Secretary of HHS appoints 18 members: 12 members are leading representatives of the health and scientific disciplines (including public health and behavioral or social sciences), and 6 are from the general public and are leaders in the fields of public policy, law, health policy, economics, and management.

Members are appointed for overlapping terms of 4 years.

The Council includes the following ex officio members:

- Secretary, HHS
- Director, NIH
- Director, NHLBI
- Chief Medical Director, or Designee, Veterans Affairs
- Assistant Secretary of Defense for Health Affairs, or Designee.

Functions

The NHLBAC reviews applications for research grants, cooperative agreements, and training grants in heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources, and recommends scientific projects that merit support to the Director, NHLBI.

The Council advises the Secretary, HHS, the Assistant Secretary for Health, HHS, and the Directors, NIH and NHLBI, on matters relating to causes, prevention, diagnosis, and treatment of diseases and resources within the purview of the Institute. The Council also may review any grant, contract, or cooperative agreement proposed to be made or entered into by the Institute; may make recommendations to the Director of the Institute respecting research conducted at the Institute; may collect, by correspondence or by personal investigation, information as to studies that are being carried on in the United States or any other country with respect to the cause, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases, and to the use of blood and blood products and the management of blood resources and with the approval of the Director of the Institute, make available such information through appropriate publications for the benefit of public and private health entities and health professions personnel and scientists and for the information of the general public; and may assemble ad hoc working groups, appoint subcommittees, and convene workshops and conferences.

The Council may also make recommendations to the Director, NIH and other authorized officials regarding the acceptance of conditional gifts pursuant to section 231 of the Public Health Service Act, as amended.

Meetings

The Chair convenes meetings not fewer than four times a year and approves the agenda.

National Heart, Lung, and Blood Advisory Council Membership*

Elizabeth G. Nabel, M.D.
Chair
National Heart, Lung, and Blood Institute

Jeanine Arden Ornt, J.D. (2010)
Case Western Reserve University

C. Noel Bairey Merz, M.D. (2011)
Cedars-Sinai Medical Center

Shaun R. Coughlin, M.D., Ph.D. (2010)
University of California, San Francisco

Victor J. Dzau, M.D. (2009)
Duke University

Charles T. Esmon, Ph.D. (2008)
Oklahoma Medical Research Foundation

Joe G. N. Garcia, M.D. (2010)
University of Chicago

Katherine A. High, M.D. (2008)
University of Pennsylvania School of Medicine

Helen H. Hobbs, M.D. (2009)
University of Texas Southwestern Medical Center

Jennie R. Joe, Ph.D. (2009)
University of Arizona

J. Hoxi Jones (2008)
Texas Health and Human Services Commission

Joseph Loscalzo, M.D., Ph.D. (2009)
Brigham and Women's Hospital

Andrew R. Marks, M.D. (2011)
Columbia University

Jeffrey McCullough, M.D. (2008)
University of Minnesota

S. K. Rao Musunuru, M.D. (2010)
Bayonet Point/Hudson Cardiology Associates

Paula Y. Polite (2010)
Division of General Services, Memphis

Marlene Rabinovitch, M.D. (2011)
Stanford University

Steven D. Shapiro, M.D. (2010)
University of Pittsburgh

Patricia W. Wahl, Ph.D. (2008)
University of Washington

Ex Officio Members

Robert L. Jesse, M.D., Ph.D.
McGuire Veterans Affairs Medical Center

Michael O. Leavett
Department of Health and Human Services

Cdr. Richard T. Mahon, M.D.
Naval Medical Research Center

Elias A. Zerhouni, Jr., M.D.
National Institutes of Health

* Current as of October 2008. The current roster, containing full addresses for the NHLBI Advisory Council and Committees, can be obtained from the Internet at http://www.nhlbi.nih.gov/meetings/nhlbac/roster.htm.

Program Advisory and Review Committee

Sickle Cell Disease Advisory Committee

Chair: Vacant

Executive Secretary: Harvey S. Luksenburg, Ph.D., Health Scientist Administrator, Division of Blood Diseases and Resources, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0050

The Sickle Cell Disease Advisory Committee advises the Secretary and the Assistant Secretary for Health, HHS and the Directors of the NIH, the NHLBI, and the DBDR on matters related to the Sickle Cell Disease Program and makes recommendations concerning planning, execution, and evaluation of all aspects of the program.

Membership*

Michael A. Bender, M.D., Ph.D. (2010)
Fred Hutchinson Cancer Research Center

Punam Malik, M.D. (2010)
Cincinnati Children's Hospital Medical Center

Susan P. Perrine, M.D. (2011)
Boston University

Yogen Saunthararajah, M.D. (2011)
Cleveland Clinic

Wally R. Smith, M.D. (2011)
Virginia Commonwealth University

Ex Officio Members
Joseph Desimone, Ph.D.
Department of Veterans Affairs, Chicago

Marie Y. Mann, M.D.
Health Resources and Services Administration

David E. McCune, M.D.
Madigan Army Medical Center

Elias A. Zerhouni, Jr., M.D.
National Institutes of Health

Sleep Disorders Research Advisory Board

Chair: Phyllis C. Zee, M.D., Ph.D., Northwestern University Medical School

Executive Secretary: Michael J. Twery, Ph.D., Director, National Center on Sleep Disorders Research, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0202.

The Sleep Disorders Research Advisory Board advises the Directors of the NIH, the NHLBI, and the NCSDR on matters related to the scientific activities carried out by and through the Center and policies regarding such activities, including the identification of research priorities for coordination of sleep and sleep disorders research by the NIH and other Federal, professional, and voluntary organizations.

Membership*

Sonia Ancoli-Israel, Ph.D. (2010)
University of California, San Diego School of Medicine

Rose A. Austin (2011)
SSM Healthcare

Karen M. Cushing (2011)
American Insomnia Association

Charles A. Czeisler M.D., Ph.D. (2011)
Harvard Medical School

Estelle B. Gauda, M.D. (2010)
Johns Hopkins University School of Medicine

F. Javier Nieto, M.D., Ph.D. (2010)
University of Wisconsin School of Medicine

Howard P. Roffwarg, M.D. (2009)
University of Mississippi Medical Center

Robert H. Waterman (2011)
The Waterman Group

* Current as of October 2008.

Ex Officio Members

Thomas J. Balkin, Ph.D.
Walter Reed Army Institute of Research

Robert W. Greene, M.D., Ph.D.
Veterans Administration, North Texas Medical Center

Merrill M. Mitler, Ph.D.
NINDS, National Institutes of Health

Andrew Monjan, Ph.D.
NIA, National Institutes of Health

Elizabeth G. Nabel, M.D.
NHLBI, National Institutes of Health

Michael J. Twery, Ph.D.
NCSDR, National Institutes of Health

Marian Willinger, Ph.D.
NICHD, National Institutes of Health

Elias A. Zerhouni, Jr., M.D.
National Institutes of Health

Heart, Lung, and Blood Initial Review Group

Scientific Review Officer: Jeffery H. Hurst, Ph.D., Health Science Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0303

The Heart, Lung, and Blood Initial Review Group provides initial technical merit review for the NHLBAC and the Director, NHLBI. This group consists of three subcommittees: the Heart, Lung, and Blood Program Project Review Committee, the Clinical Trials Review Committee, and the NHLBI Institutional Training Mechanism Review Committee.

Heart, Lung, and Blood Program Project Review Committee

Chair: Susan S. Smyth, M.D., Ph.D., The Gill Heart Institute

Scientific Review Officer: Jeffery H. Hurst, Ph.D., Health Scientist Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0303

The Heart, Lung, and Blood Program Project Review Committee provides initial technical merit review for the NHLBAC and the Director, NHLBI on program project applications proposing research in the areas of heart, lung, and blood diseases and resources.

Membership*

Edward Abraham, M.D. (2009)
University of Alabama at Birmingham

David Atkinson, Ph.D. (2012)
Boston University School of Medicine

Karen E. Bornfeldt, Ph.D. (2011)
University of Washington

Peng-Sheng Chen, M.D. (2010)
Indiana University School of Medicine

Samuel Hawgood, M.D. (2010)
University of California, San Francisco

Catherine C. Hedrick, Ph.D. (2011)
University of Virginia

Sriram Krishnaswamy, Ph.D. (2009)
Children's Hospital of Philadelphia

Christine S. Moravec, Ph.D. (2012)
Cleveland Clinic Foundation

Diane J. Nugent, M.D. (2009)
University of California, Los Angeles

David J. Pinsky, M.D. (2012)
University of Michigan

Bruce R. Pitt, Ph.D. (2009)
University of Pittsburgh

Nanduri R. Prabhakar, Ph.D. (2012)
University of Chicago

Ann Marie Schmidt, M.D., Ph.D. (2010)
Columbia University

* Current as of October 2008.

Curt D. Sigmund, Ph.D. (2011)
University of Iowa

Arun Srivastava, Ph.D. (2011)
University of Florida

Robert A. Wise, M.D. (2010)
Johns Hopkins University School of Medicine

Katherine E. Yutzey, Ph.D. (2010)
Children's Hospital Research Foundation

Clinical Trials Review Committee

Chair: Vacant

Scientific Review Officer: Keary A. Cope, Ph.D., Health Science Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–2222

The Clinical Trials Review Committee provides initial technical merit review for the NHLBAC and the Director of the NHLBI on clinical trial applications for the support of studies to evaluate preventive or therapeutic measures of blood, cardiovascular, or lung diseases.

Membership*

Walter T. Ambrosius, Ph.D. (2010)
Wake Forest University

Ulrika M. Birgersdotter-Green, M.D. (2009)
University of California, San Diego

Ivan Chan, Ph.D. (2010)
Merck Research Laboratories

Scott S. Emerson, M.D., Ph.D. (2011)
University of Washington

Kenneth E. Freedland, Ph.D. (2011)
Washington University School of Medicine

Terry B. Gernsheimer, M.D. (2009)
University of Washington School of Medicine

Robert A. Harrington, M.D. (2010)
Duke School of Medicine

Wendy J. Mack, Ph.D. (2011)
University of Southern California

Pamela Ouyang, M.D. (2010)
Johns Hopkins University School of Medicine

John J. Reilly, M.D. (2009)
Brigham and Women's Hospital

NHLBI Institutional Training Mechanism Review Committee

Chair: William C. Balke, M.D., University of Kentucky

Scientific Review Officer: Charles Joyce, Ph.D., Health Science Administrator, Division of Extramural Research Activities, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–435–0291

NHLBI Institutional Training Mechanism Review Committee provides initial technical merit review for the NHLBAC and the Director of the NHLBI on training applications that provide predoctoral, postdoctoral, and short-term research training at academic institutions.

Membership*

Ifeanyi J. Arinze, Ph.D. (2012)
Meharry Medical College

Linda J. Burns, M.D. (2011)
University of Minnesota

David M. Center, M.D. (2011)
Boston University Medical Campus

David M. Guidot, M.D. (2010)
Emory University

Meredith Hay, Ph.D. (2009)
University of Iowa

Carlton A. Hornung, Ph.D. (2010)
University of Louisville

Mariell Jessup, M.D. (2009)
University of Pennsylvania Health System

* Current as of October 2008.

Craig K. Kent, M.D. (2010)
Weill Medical College of Cornell University

Bertram H. Lubin, M.D. (2010)
Children's Hospital Oakland Research Institute

Russell V. Luepker, M.D. (2012)
University of Minnesota

Jonathan C. Makielski, M.D. (2012)
University of Wisconsin Hospitals and Clinics

Fernando J. Martinez, M.D. (2009)
University of Michigan at Ann Arbor

Josef T. Prchal, M.D. (2012)
University of Utah

Sharon Rounds, M.D. (2010)
Brown University

Robin Shandas, Ph.D. (2012)
University of Colorado Health Sciences Center

Sanjeev G. Shroff, Ph.D. (2010)
University of Pittsburgh

Brian Smith, M.D. (2011)
Yale University School of Medicine

Marilyn J. Telen, M.D. (2009)
Duke University Medical Center

Mary I. Townsley, Ph.D. (2012)
University of South Alabama

Donna H. Wang, M.D. (2011)
Michigan State University

Scott T. Weiss, M.D. (2011)
Brigham and Women's Hospital

Marlys H. Witte, M.D. (2009)
University of Arizona, Health Sciences Center

Reen Wu, Ph.D. (2011)
University of California at Davis

National Heart, Lung, and Blood Institute Special Emphasis Panel

The Institute has established the NHLBI Special Emphasis Panel (SEP) to perform initial peer review of applications and proposals that were previously handled by ad hoc committees. Concept review, previously handled by divisional program advisory committees, has also been incorporated into the SEP system. The SEP, which has neither a fixed membership nor a set meeting schedule, is constituted to provide required peer review expertise at precisely the time that it is needed.

Board of Scientific Counselors

Chair: Gary K. Owens, M.D., Ph.D., University of Virginia School of Medicine

Executive Secretary: Robert S. Balaban, Ph.D., Director, Laboratory Research Program, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301–496–2116

The Board of Scientific Counselors advises the Director and the Deputy Director for Intramural Research, NIH, and the Directors of NHLBI and the Division of Intramural Research, NHLBI, on the intramural research programs of the NHLBI.

Membership*

Stephen Black, Ph.D. (2011)
Medical College of Georgia

Eduardo Marban, M.D., Ph.D. (2011)
Johns Hopkins University

Elizabeth M. McNally, M.D., Ph.D. (2010)
University of Chicago

Edwin W. Taylor, Ph.D. (2009)
University of Chicago

Alan S. Verkman, M.D., Ph.D. (2009)
University of California, San Francisco

* Current as of October 2008.

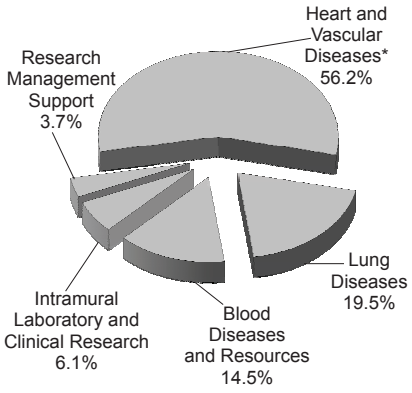
7. Fiscal Year 2008 Budget Overview

NHLBI Obligations by Funding Mechanism: Fiscal Year 2008

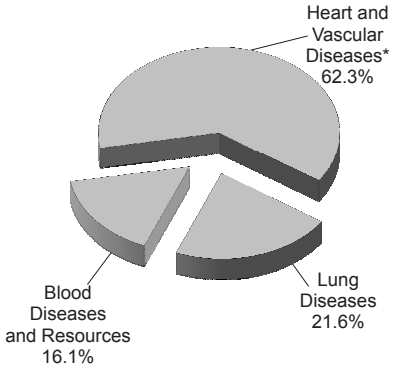
Funding Mechanism	Obligated Dollars* (Thousands)	Percent of Total NHLBI Budget
Research Project Grants**	$1,983,633	67.5%
SCORs/SCCORs	90,120	3.1
Sickle Cell Centers	13,587	0.5
Centers for AIDS Research	3,686	0.1
Other Research Grants	125,942	4.3
Research Careers Programs†	*78,715*	*2.7*
Training Programs	94,873	3.2
Research and Development Contracts	338,787	11.5
Intramural Laboratory and Clinical Research	177,490	6.1
Research Management and Support‡	109,215	3.7
Total Obligations	**$2,937,333**	**100.0%**

* Excludes funds provided by other Agencies by means of a reimbursable agreement.
** Includes $77,914 for Small Business Innovation Research (SBIR) Grants/Small Business Technology Transfer (STTR) Grants.
† Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.
‡ Excludes OD and DIR research contracts, which are included in R&D contracts.

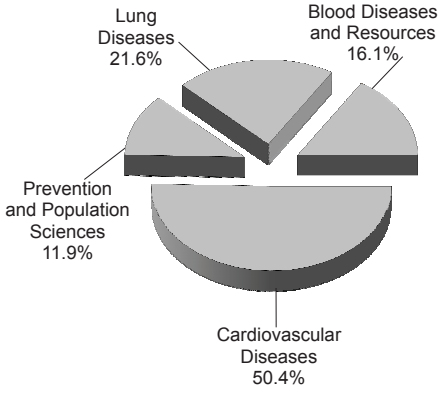
NHLBI Total Obligations by Budget Category



NHLBI Extramural Obligations by Program



NHLBI Extramural Obligations by Division



* Includes Cardiovascular Diseases and Prevention and Population Sciences.

For detailed data on FY 2008:
- Research grants, see Chapters 9 and 11.
- Research and development contracts, see Chapters 10 and 11.
- Research training and career development, see Chapter 13.
- Geographic distribution of awards, see Chapter 14.

NHLBI Extramural Obligations by Program: Fiscal Year 2008

Program	Obligated Dollars (Thousands)	Percent of NHLBI Extramural Budget
Heart and Vascular Diseases*	$1,652,204	62.3%
Lung Diseases	572,172	21.6
Blood Diseases and Resources	426,252	16.1
Total, Extramural Obligations	**$2,650,628**	**100%**

* Includes Cardiovascular Diseases and Prevention and Population Sciences.

NHLBI Cardiovascular Diseases Program* Obligations by Funding Mechanism: Fiscal Year 2008

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$1,024,361	76.7%
SCORs/SCCORs	44,548	3.3
Other Research Grants	43,647	3.3
*Research Career Programs***	*31,762*	*2.4*
Training Programs	44,504	3.3
Research and Development Contracts	178,713	13.4
Total, Cardiovascular Diseases	**$1,335,773**	**100%**

* Includes Cardiovascular Diseases only.
** Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.

NHLBI Prevention and Population Sciences Program Obligations by Funding Mechanism: Fiscal Year 2008

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$178,724	56.5%
SCORs/SCCORs	—	—
Other Research Grants	9,833	3.1
*Research Career Programs**	6,428	*2.0*
Training Programs	8,092	2.6
Research and Development Contracts	119,782	37.9
Total, Prevention and Population Sciences	**$316,431**	**100%**

* Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.
Note: Numbers may not add to total due to rounding.

NHLBI Lung Diseases Program
Obligations by Funding Mechanism: Fiscal Year 2008

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$458,438	80.1%
SCORs/SCCORs	25,505	4.5
Other Research Grants	44,789	7.8
*Research Career Programs**	*25,765*	*4.5*
Training Programs	25,241	4.4
Research and Development Contracts	18,199	3.2
Total, Lung Diseases	**$572,172**	**100%**

* Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.

NHLBI Blood Diseases and Resources Program
Obligations by Funding Mechanism: Fiscal Year 2008

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$322,110	75.6%
SCORs/SCCORs	20,067	4.7
Sickle Cell Centers	13,587	3.2
Centers for AIDS Research	3,686	0.9
Other Research Grants	27,674	6.5
*Research Career Programs**	*14,760*	*3.5*
Training Programs	17,035	4.0
Research and Development Contracts	22,093	5.2
Total, Blood Diseases and Resources	**$426,252**	**100%**

* Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.

8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950–2008

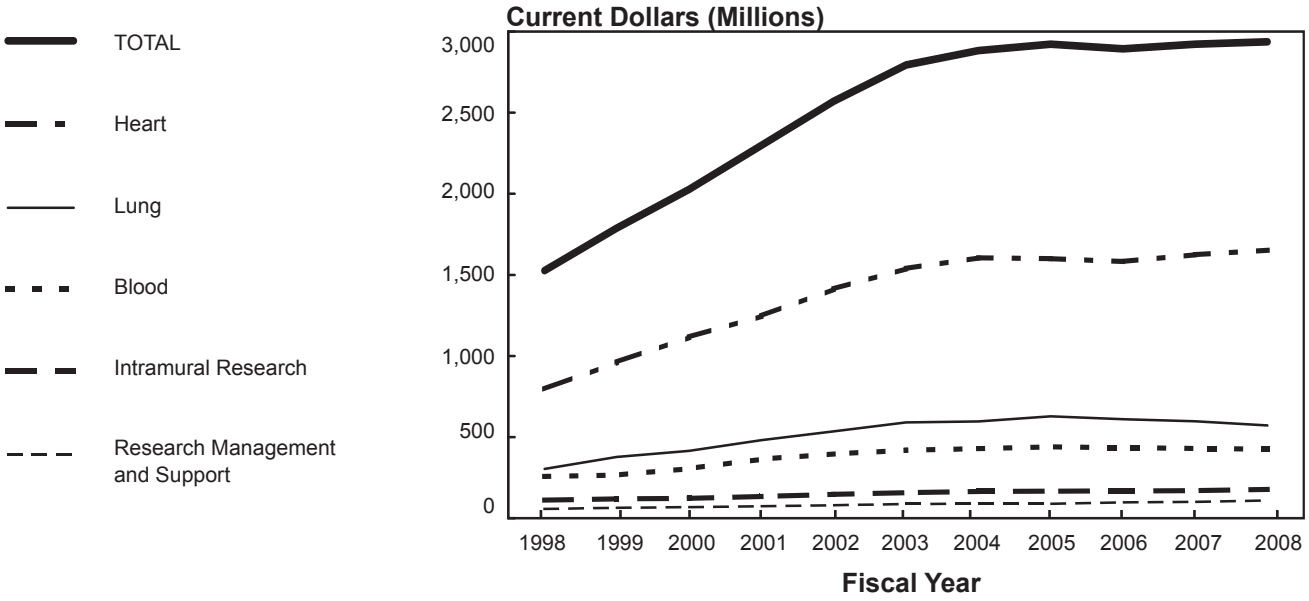
Dollars (Thousands)

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
1950	$ 34,630	$ 11,575	$ 29,117	$ 16,075	$ 15,768	$ 15,768
1951	8,800	8,800	9,400	9,400	8,497	24,265
1952	10,237	10,074	10,156	10,083	9,850	34,115
1953	9,779	9,623	12,000	12,000	11,398	45,513
1954	11,040	12,000	15,418	15,168	14,952	60,465
1955	14,570	16,168	17,168	16,668	16,595	77,060
1956	17,454	17,398	23,976	18,808	18,838	95,898
1957	22,106	25,106	33,396	33,396	32,392	128,290
1958	33,436	33,436	38,784	35,936	35,973	164,263
1959	34,820	36,212	49,529	45,613	45,468	209,731
1960	45,594	52,744	89,500	62,237	61,565	271,296
1961	63,162	71,762	125,166	86,900	86,239	357,535
1962	97,073	105,723	160,000	132,912	110,849	468,384
1963	126,898	143,398	149,498	147,398	120,597	588,981
1964	130,108	129,325	130,545	132,404	117,551	706,532
1965	125,640	124,521	125,171	124,824	124,412	830,944
1966	141,412	146,212	143,462	141,462	141,171	972,115
1967	148,407	154,770	164,770	164,770	164,342	1,136,457
1968	167,954	167,954	177,954	167,954	162,134	1,298,591
1969	169,735	164,120	172,120	166,928	161,834	1,460,425
1970	160,513	160,513	182,000	171,257	160,433	1,620,858
1971	171,747	178,479	203,479	194,901	194,826	1,815,684
1972	195,492	211,624	252,590	232,627	232,577	2,048,261
1973	255,280	300,000	350,000	300,000	255,722	2,303,983
1974	265,000	281,415	320,000	302,915	327,270	2,631,253
1975	309,299	321,196	330,000	327,996	327,953	2,959,206
1976	324,934	329,079	379,059	370,096	368,648	3,327,854
TQ[A]	59,715	58,015	58,015	58,763	60,639	3,388,493
1977	342,855	380,661	420,661	396,661	396,857	3,785,350
1978	403,642	432,642	456,000	447,901	447,968	4,233,318
1979	454,336	485,584	485,584	510,134	510,080	4,743,398
1980	507,344	527,544	527,544	527,544	527,248	5,270,646
1981	532,799	560,264	565,264	549,693	550,072	5,820,718
1982	579,602	583,831	587,741	559,637	559,800	6,380,518
1983	577,143	620,947	624,542	624,259	624,260	7,004,778
1984	639,774	665,859	683,489	704,939	705,064	7,709,842
1985	718,852	764,135	807,149	805,269	803,810	8,513,652
1986	775,254	856,388	863,652	859,239	821,901	9,335,553
1987	785,697	921,410	921,502	930,001	929,982	10,265,535
1988	821,887	990,808	1,000,349	965,536	965,283	11,230,818
1989	1,054,503	1,018,983	1,056,003	1,045,985	1,045,508	12,276,326
1990	1,039,846	1,090,930	1,091,597	1,072,354	1,070,683	13,347,009
1991	1,112,502	1,135,589	1,137,235	1,126,942	1,125,915	14,472,924
1992	1,209,924	1,202,398	1,190,396	1,191,500	1,190,070	15,662,994
1993	1,245,396	1,228,455	1,228,455	1,214,693	1,214,693	16,877,687
1994	1,198,402	1,277,880	1,277,880	1,277,880	1,277,852	18,155,539
1995	1,266,961	1,259,590	1,259,590	1,258,472	1,314,969	19,470,508
1996	1,337,021	1,355,866	1,320,254[B]	1,355,866	1,351,422[C]	20,821,930
1997	1,320,555[D]	1,438,265	1,344,742[D]	1,432,529[E]	1,431,821	22,253,751
1998	1,467,189	1,513,004	1,531,898	1,531,061[F]	1,526,276	23,780,027
1999	1,709,328[G]	1,720,344	1,793,697	1,793,697[F]	1,788,008	25,568,035
2000	1,759,806	1,937,404	2,001,185	2,040,291[F]	2,027,286	27,595,321
2001	2,069,582	2,328,102	2,328,105	2,299,866[H]	2,298,035	29,893,356
2002	2,567,429	2,547,675	2,618,966	2,576,125[I]	2,569,794	32,463,150
2003	2,791,411	2,812,011	2,818,684	2,812,011[J]	2,793,681	35,256,831
2004	2,867,995	2,867,995	2,897,595	2,882,715[K]	2,882,601	38,139,432
2005	2,963,953	2,963,953	2,985,900	2,965,453	2,922,573[L]	41,062,005
2006	2,951,270	2,951,270	3,023,381	2,951,270[J]	2,893,527	43,955,532
2007	2,901,012	2,901,012	2,924,299	2,921,757	2,922,322[L]	46,877,854
2008	2,894,341	2,965,775	2,992,197	2,974,900	2,937,333	49,815,187

A TQ=Transition Quarter, July 1–September 30, 1976.
B Senate Allowance reflects the Institute share of the Government-wide rescission and the HHS rescission.
C Obligations reflect the Institute share of the Government-wide rescission, the HHS rescission, and a transfer to other NIH Institutes through the NIH Director's 1 percent transfer authority.
D Excludes funds for AIDS research activities consolidated in the NIH Office of AIDS Research (OAR).
E Excludes enacted administrative reduction.
F Excludes Director transfer, Secretary transfer, and rescission.
G Includes Bioterrorism reduction.
H Excludes Office of Human Research Protection transfer, Secretary transfer, and rescission.
I Excludes Government-wide rescission, Labor/HHS/Education rescission, from HHS to OMB rescission, and Secretary 1 percent transfer.
J Excludes Government-wide rescission.
K Includes Roadmap adjustments.
L Includes Roadmap Transfer and Government-wide rescission.

NHLBI Total Obligations by Budget Category: Fiscal Years 1998–2008

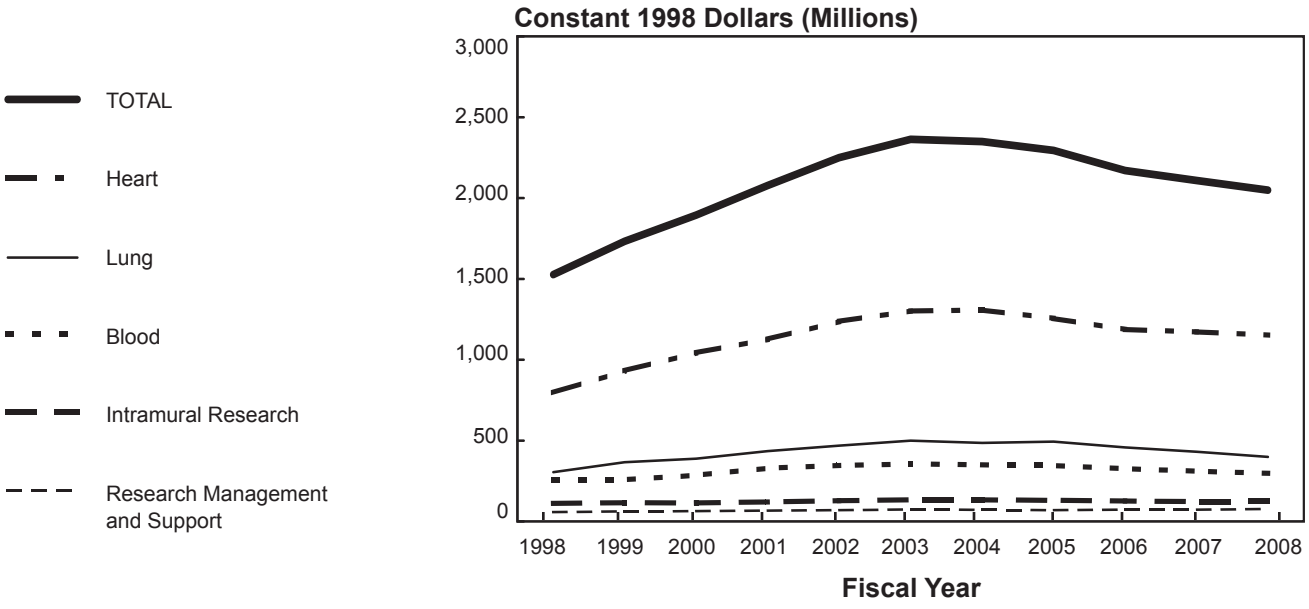
Current Dollars



Note: From 1999 to 2006, the WHI was reported separately. In this chart, it has been incorporated into the "Heart" line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this chart, it has been incorporated into the "Lung" line.

NHLBI Total Obligations by Budget Category: Fiscal Years 1998–2008

Constant 1998 Dollars



Note: From 1999 to 2006, the WHI was reported separately. In this chart, it has been incorporated into the "Heart" line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this chart, it has been incorporated into the "Lung" line.

NHLBI Total Obligations by Budget Category: Fiscal Years 1998–2008

Current Dollars (Millions)

	Fiscal Year										
Budget Category	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Extramural Research											
Heart	$ 795.6	$ 961.1	$1,115.7	$1,245.8	$1,412.4	$1,538.8	$1,604.7	$1,599.6	$1,582.7	$1,624.9	$1,652.2
Lung	304.0	377.4	415.5	481.0	535.2	590.5	596.0	628.2	610.3	597.6	572.2
Blood	257.5	266.1	305.9	364.0	396.0	419.3	429.2	439.5	434.9	429.7	426.2
Intramural Research	111.6	119.5	122.3	133.7	146.7	157.8	164.2	166.3	168.3	169.5	177.5
Research Management and Support	57.6	63.9	67.9	73.5	79.4	87.3	88.5	89.0	97.2	100.6	109.2
Total	**$1,526.3**	**$1,788.0**	**$2,027.3**	**$2,298.0**	**$2,569.7**	**$2,793.7**	**$2,882.6**	**$2,922.6**	**$2,893.4**	**$2,922.3**	**$2.937.3**

Note: From 1999 to 2006, the WHI was reported separately. In this table, it has been incorporated into the "Heart" line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this table, it has been incorporated into the "Lung" line.

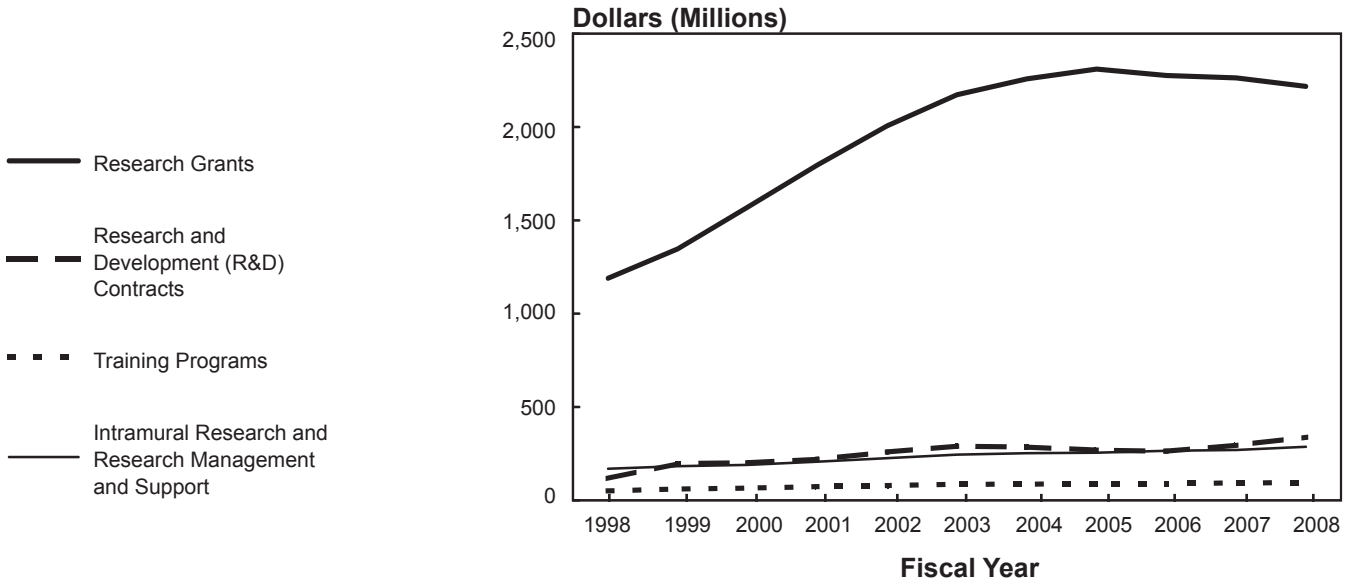
NHLBI Total Obligations by Budget Category: Fiscal Years 1998–2008

Constant 1998 Dollars (Millions)

	Fiscal Year										
Budget Category	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Extramural Research											
Heart	$ 795.6	$ 931.3	$1,042.7	$1,126.4	$1,236.8	$1,301.9	$1,307.8	$1,255.6	$1,187.3	$1,172.4	$1,152.2
Lung	304.0	365.7	388.3	434.9	468.7	499.6	485.7	493.1	457.8	431.2	399.0
Blood	257.5	257.8	285.9	329.1	346.8	354.7	349.8	345.0	326.3	310.0	297.2
Intramural Research	111.6	115.8	114.3	120.9	128.5	133.5	133.8	130.5	126.3	122.3	123.8
Research Management and Support	57.6	61.9	63.5	66.5	69.5	73.9	72.1	69.9	72.9	72.6	76.2
Total	**$1,526.3**	**$1,732.6**	**$1,894.7**	**$2,077.8**	**$2,250.2**	**$2,363.5**	**$2,349.3**	**$2,294.0**	**$2,170.6**	**$2,108.4**	**$2,048.3**

This table is based on the Biomedical Research & Development Price Index through 2008.
Note: From 1999 to 2006, the WHI was reported separately. In this table, it has been incorporated into the "Heart" line. The Sleep Disorders Research was reported separately from 1996 to 2006. In this table, it has been incorporated into the "Lung" line.

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1998–2008



NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1998–2008

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Research Grants*	$1,189.8	$1,346.6	$1,570.5	$1,796.9	$2,006.2	$2,172.3	$2,257.3	$2,310.2	$2,275.9	$2,263.1	$2,216.9
Research and Development (R&D) Contracts	116.7	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.8	295.8	338.8
Training Programs	50.6	60.8	65.4	73.7	79.2	85.8	87.1	88.4	89.2	93.3	94.9
Intramural Research and Research Management and Support**	169.2	183.4	190.1	207.3	226.1	245.1	252.7	255.4	265.6	270.1	286.7
Total	**$1,526.3**	**$1,788.0**	**$2,027.3**	**$2,298.0**	**$2,569.8**	**$2,793.7**	**$2,882.6**	**$2,922.6**	**$2,893.5**	**$2,922.3**	**$2,937.3**

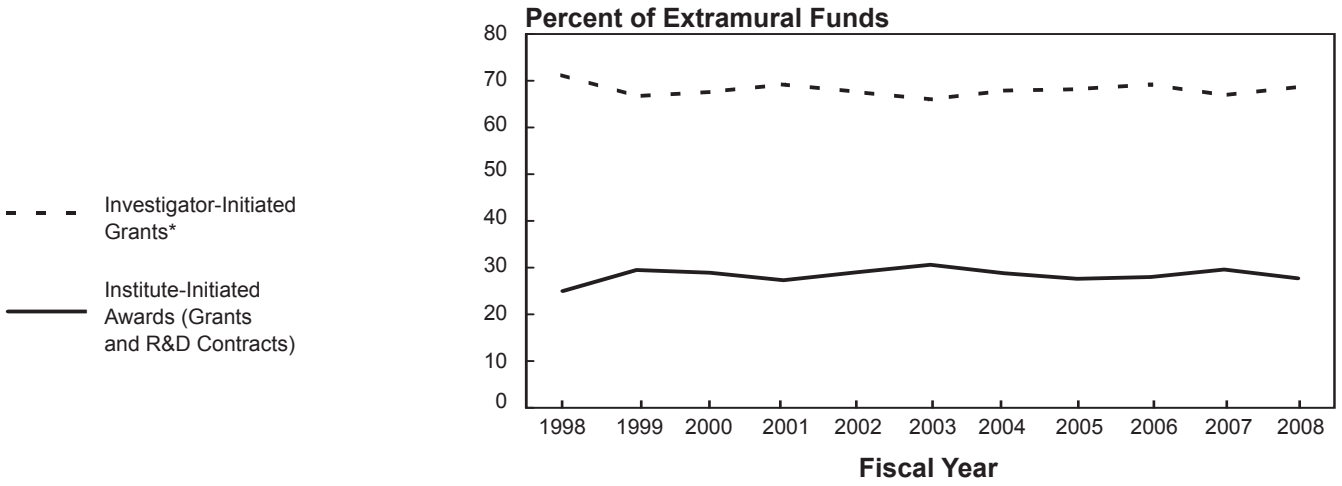
* Includes Research Career Programs.
** Excludes Office of the Director and DIR research contracts, which are included in R&D contracts.

NHLBI Employment: Fiscal Years 1998–2008

	Fiscal Year										
Staff	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
FTEs*	840	847	865	868	880	880	861	796	797	814	846

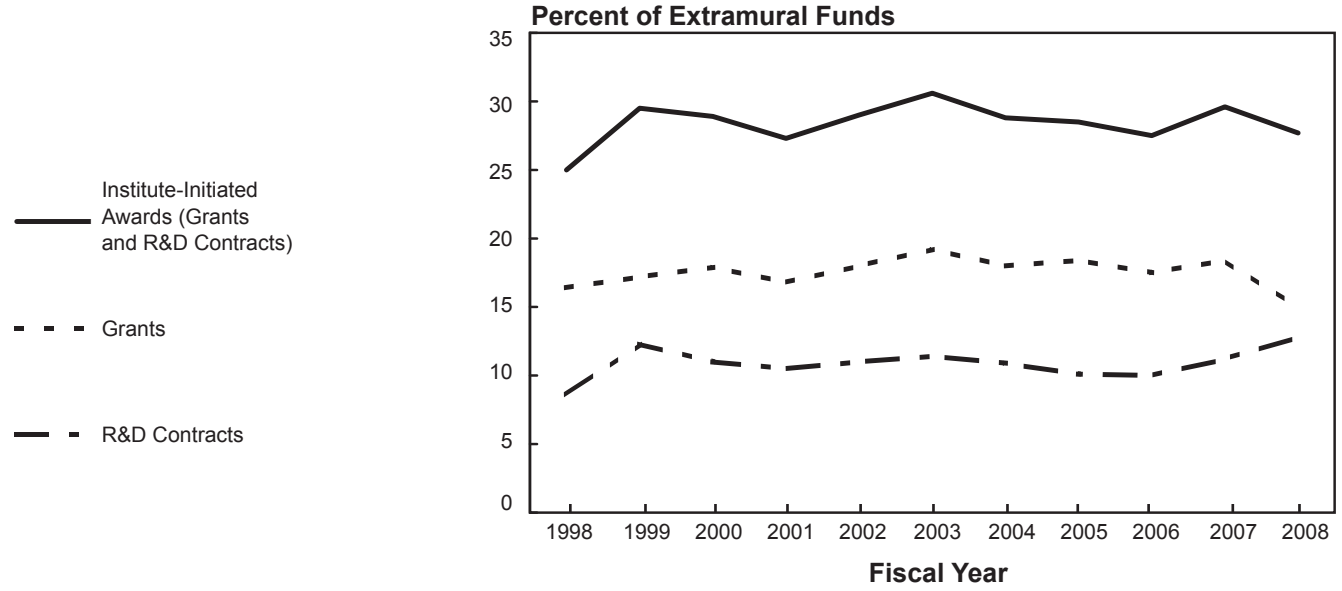
* Full-time equivalents.

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1998–2008



* Includes Research Career Programs.

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1998–2008



NHLBI Extramural Programs: Fiscal Years 1998–2008

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	$ 930.5	$1,022.2	$1,187.4	$1,388.8	$1,521.4	$1,616.1	$1,716.8	$1,747.2	$1,747.0	$1,719.3	$1,742.1
Research Career Programs	36.1	47.7	54.2	57.5	63.5	65.8	67.8	71.0	70.4	55.4	78.7
Subtotal, Investigator-Initiated Awards	966.6	1,069.9	1,241.6	1,446.3	1,584.9	1,681.9	1,784.6	1,818.2	1,817.3	1,774.7	1,820.8
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	223.2	276.7	328.9	350.7	421.3	490.4	472.5	492.1	458.6	488.2	396.1
*Centers***	*114.4*	*119.9*	*123.8*	*127.2*	*128.2*	*138.9*	*140.6*	*151.5*	*141.1*	*141.0*	*107.3*
R&D Contracts (RFP)	116.7	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8
Subtotal, Institute-Initiated Awards	339.9	473.9	530.2	570.8	679.6	780.9	758.0	760.7	721.4	784.0	734.9
Training											
Individual Awards	7.6	9.2	8.9	8.9	9.5	8.6	8.8	9.7	10.0	8.2	9.0
Institutional Awards	43.0	51.6	56.5	64.8	69.7	77.2	78.4	78.7	79.1	85.1	85.8
Subtotal, Training	50.6	60.8	65.4	73.7	79.2	85.8	87.2	88.4	89.2	93.3	94.8
Total, Extramural	**$1,357.1**	**$1,604.6**	**$1,837.2**	**$2,090.8**	**$2,343.7**	**$2,548.6**	**$2,629.8**	**$2,667.3**	**$2,628.0**	**$2,652.0**	**$2,650.5**

* Includes all R18s.
** Centers are a subset of Institute-Initiated Grants (RFAs) and are not added to the Institute-Initiated Awards subtotal as a distinct category.

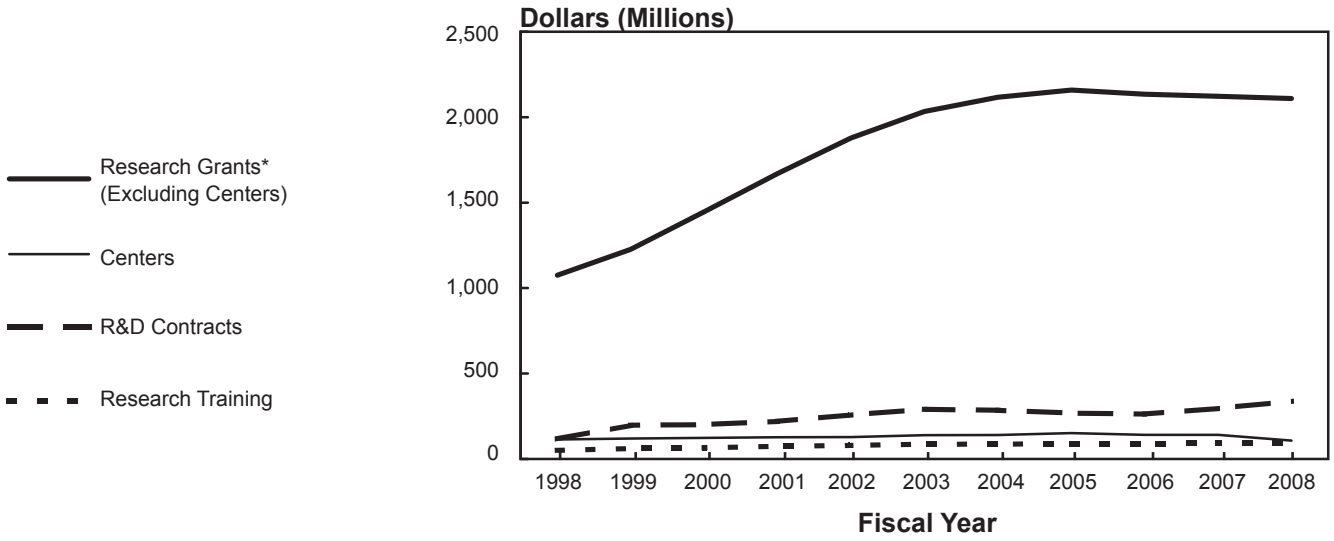
NHLBI Extramural Programs: Fiscal Years 1998–2008

Percent of Total Extramural Budget

	Fiscal Year										
Funding Mechanism	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	68.6%	63.7%	64.6%	66.4%	64.9%	63.4%	65.3%	65.5%	66.5%	64.8%	65.7%
Research Career Programs (K04, K06)	2.7	3.0	3.0	2.8	2.7	2.6	2.6	2.7	2.7	2.1	3.0
Subtotal, Investigator-Initiated Awards	71.2	66.7	67.6	69.2	67.6	66.0	67.9	68.2	69.2	66.9	68.7
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	16.4	17.2	17.9	16.8	18.0	19.2	18.0	18.4	17.5	18.4	14.9
*Centers***	*8.4*	*7.5*	*6.7*	*6.1*	*5.5*	*5.5*	*5.3*	*5.7*	*5.4*	*5.3*	*4.0*
R&D Contracts (RFP)	8.6	12.3	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8
Subtotal, Institute-Initiated Awards	25.0	29.5	28.9	27.3	29.0	30.6	28.8	28.5	27.5	29.6	27.7
Training											
Individual Awards	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3
Institutional Awards	3.2	3.2	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.2	3.2
Subtotal, Training	3.7	3.8	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6
Total, Extramural	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

* Includes all R18s.
** Centers are a subset of Institute-Initiated Grants (RFAs) and are not added to the Institute-Initiated Awards subtotal as a distinct category.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1998–2008



* Includes Research Career Programs; does not include Centers.

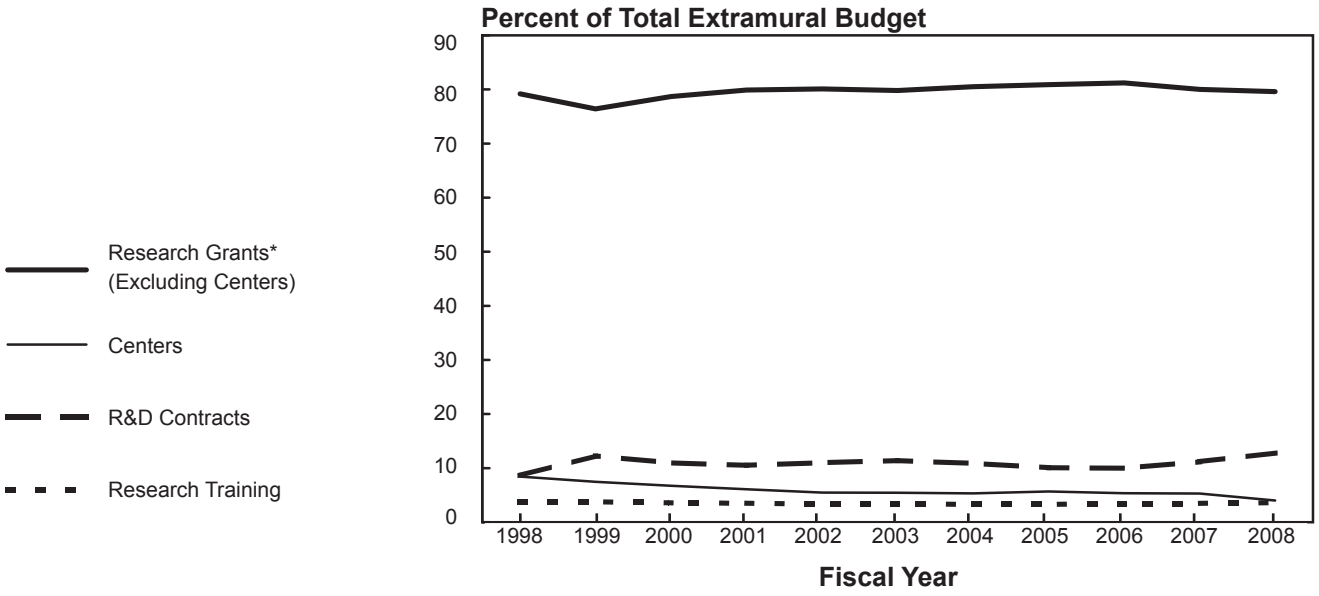
NHLBI Extramural Research Funding Mechanism: Fiscal Years 1998–2008

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Research Grants*	$1,075.4	$1,226.7	$1,446.7	$1,669.8	$1,878.0	$2,033.4	$2,116.6	$2,158.8	$2,134.9	$2,121.9	$2,109.6
Centers	114.4	119.9	123.8	127.2	128.2	138.9	140.6	151.5	141.1	141.0	107.3
R&D Contracts	116.7	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8
Research Training	50.6	60.8	65.4	73.7	79.2	85.8	87.1	88.4	89.2	93.3	94.8
Total, Extramural	**$1,357.1**	**$1,604.6**	**$1,837.2**	**$2,090.8**	**$2,343.7**	**$2,548.6**	**$2,629.8**	**$2,667.3**	**$2,628.0**	**$2,652.0**	**$2,650.5**

* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1998–2008



* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1998–2008

Percent of Total Extramural Budget

	Fiscal Year										
Funding Mechanism	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Research Grants*	79.2%	76.4%	78.7%	79.9%	80.1%	79.8%	80.5%	80.9%	81.2%	80.0%	79.6%
Centers	8.4	7.5	6.7	6.1	5.5	5.5	5.3	5.7	5.4	5.3	4.0
R&D Contracts (RFP)	8.6	12.3	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8
Research Training	3.7	3.8	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6
Total, Extramural	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

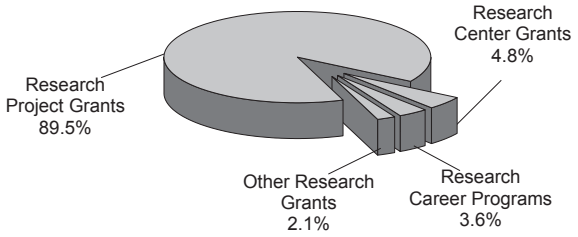
* Includes Research Career Programs; does not include Centers.
Note: Numbers may not add to total due to rounding.

9. Research Grants

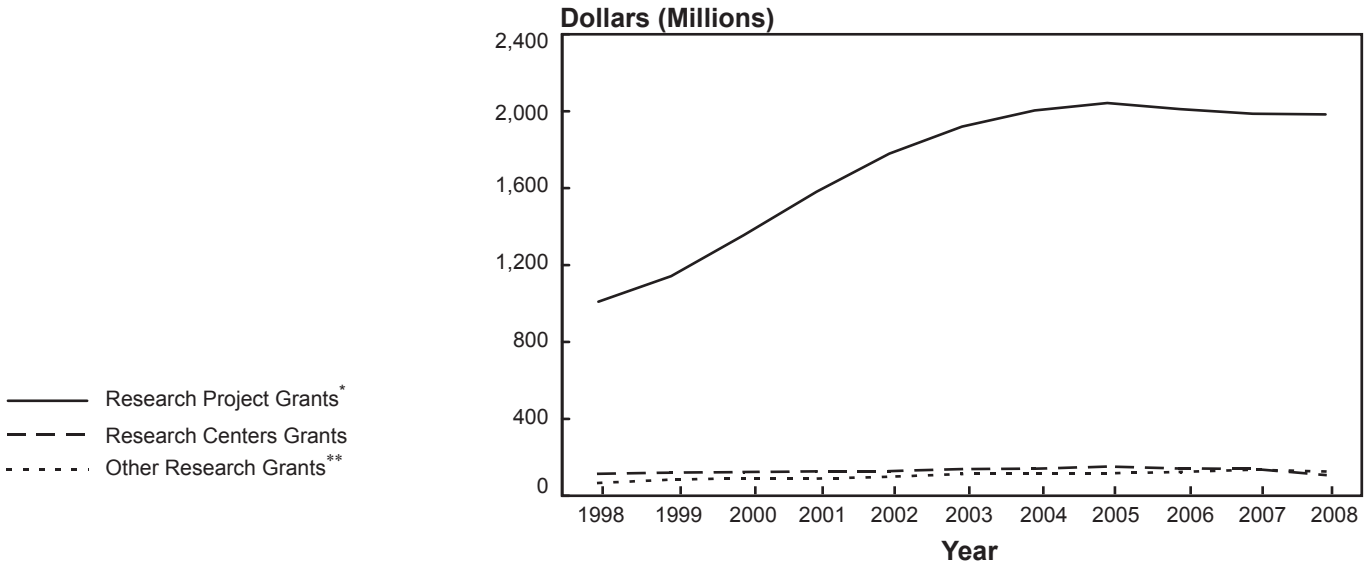
NHLBI Research Grants by Funding Mechanism: Fiscal Year 2008

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
Research Project Grants (RPGs)			
Research Project Grants (Excluding Small Business RPGs)			
Regular Research Grants (R01)	3,068	$1,306,763	58.94%
Program Project Grants (P01)	161	328,652	14.82
Cooperative Agreements (U01)	184	170,800	7.70
Explorative Developmental Grant (R21)	214	45,478	2.05
Method to Extend Research in Time (R37)	69	29,969	1.35
Exploratory/Developmental Grants Phase II (R33)	34	10,382	0.47
Area Grants (R15)	24	4,937	0.22
NIH Director's New Innovator's Award (DP2)	—	2,388	0.11
Research Transition Award (R00)	9	2,180	0.10
Cooperative Agreements (U19)	1	2,089	0.09
Small Research Grants (R03)	16	1,242	0.06
NIH Director's Pioneer Award (DP1)	—	839	0.04
Subtotal, Research Project Grants (Excluding Small Business RPGs)	3,780	1,905,719	85.96
Small Business Research Project Grants			
Small Business Technology Transfer (STTR Phase I) (R41)	14	2,030	0.09
Small Business Technology Transfer (STTR Phase II) (R42)	17	8,374	0.38
Small Business Innovation Research (SBIR Phase I) (R43)	49	9,246	0.42
Small Business Innovation Research (SBIR Phase II) (R44)	93	58,264	2.63
Subtotal, Small Business Research Project Grants	173	77,914	3.51
Subtotal, Research Project Grants	3,953	1,983,633	89.49
Research Center Grants			
Specialized Centers of Clinical Research (SCCOR) (P50)	30	81,189	3.66
Sickle Cell Centers (U54)	13	13,587	0.61
Center for AIDS Research (P30)	—	3,686	0.17
Specialized Centers (Cooperative Agreements) (U54)	5	8,496	0.38
National Swine Research and Resource Center (U42)	—	435	0.02
Subtotal, Research Center Grants	48	107,393	4.84
Research Career Programs			
Mentored Research Development Award for Minority Faculty (K01)	35	4,574	0.21
Minority Institution Faculty Mentored Research Scientist Award (K01)	7	949	0.04
Mentored Scientist Development Award in Research Ethics (K01)	1	102	0.00
Independent Scientist Award (K02)	22	2,184	0.10
Pediatric Transfusion Medicine Academic Award (K07)	4	486	0.02
Cultural Competence & Health Disparities Academic Award (K07)	18	2,197	0.10
Clinical Investigator Scientist Award (K08)	210	27,005	1.22
Vascular Medicine Research Career Development Program (K12)	7	5,499	0.25
Clinical Hematology Research Career Development Program (K12)	6	2,364	0.11
Genetics and Genomics of Lung Disease Career Development Program (K12)	8	3,190	0.14
Career Enhancement Award for Stem Cell Research (K18)	6	1,014	0.05
Career Transition Award (K22)	1	162	0.01
Mentored Patient-Oriented Research Career Development Award (K23)	133	18,556	0.84
Midcareer Investigator Award in Patient-Oriented Research (K24)	29	4,161	0.19
Mentored Quantitative Research Career Development Award (K25)	15	2,082	0.09
Career Transition Award (K99)	47	4,190	0.19
Subtotal, Research Career Programs	549	78,715	3.56
Other Research Grants			
Cooperative Clinical Research (U10, R10)	29	23,514	1.06
Minority Biomedical Research Support (S06, R25, SC2)	7	1,527	0.07
Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1)	93	22,186	1.00
Subtotal, Other Research Grants	129	47,227	2.13
Total, NHLBI Research Grants	**4,679**	**$2,216,968**	**100%**

NHLBI Total Research Grants by Category



NHLBI Research Project Grants,* Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 1998–2008



* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

** Includes Research Career Programs; excludes General Research Support Grants.

NHLBI Research Project Grants,* Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 1998–2008

Dollars (Thousands)

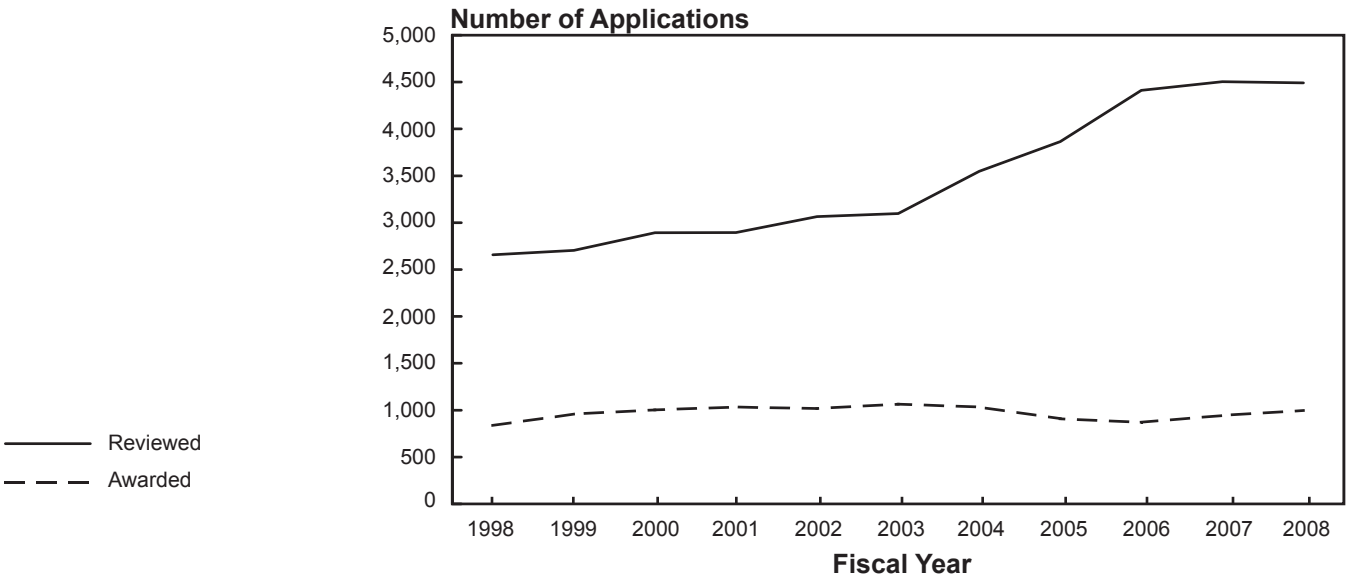
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Research Project Grants*	$1,009,152	$1,142,473	$1,356,034	$1,580,751	$1,779,573	$1,920,201	$2,003,769	$2,042,050	$2,011,049	$1,986,692	$1,983,633
Research Centers Grants	114,397	119,889	123,803	127,232	128,161	138,941	140,600	151,495	141,086	141,034	107,393
Other Research Grants**	66,234	84,219	90,666	88,958	98,460	113,172	112,785	116,713	123,802	135,284	125,942
Total	**$1,189,783**	**$1,346,581**	**$1,570,503**	**$1,796,941**	**$2,006,194**	**$2,172,314**	**$2,257,154**	**$2,310,258**	**$2,275,937**	**$2,263,010**	**$2,216,968**

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

** Includes Research Career Programs; excludes General Research Support Grants.

NHLBI Competing Research Project Grant Applications:* Fiscal Years 1998–2008

Number Reviewed and Awarded

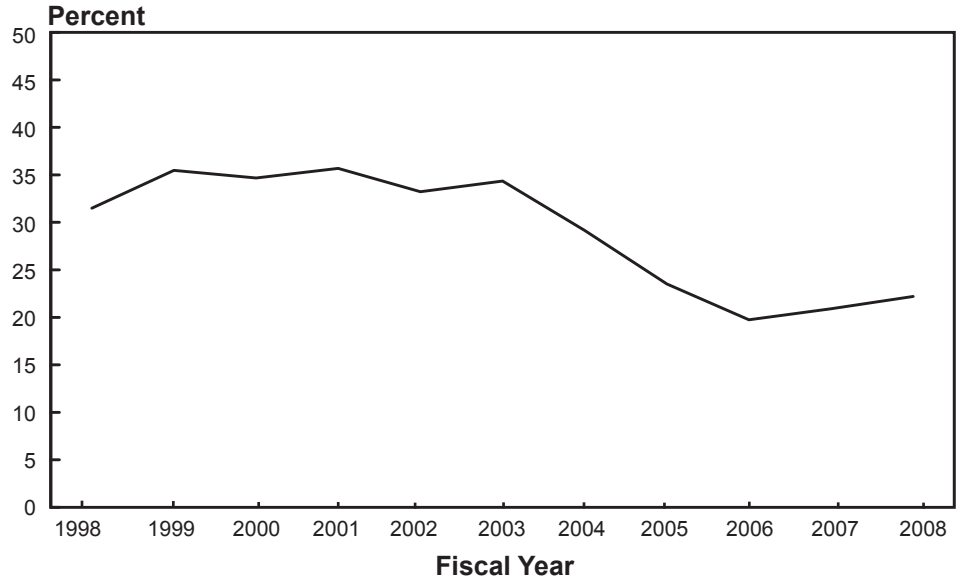


Number Reviewed and Awarded and Percent Funded

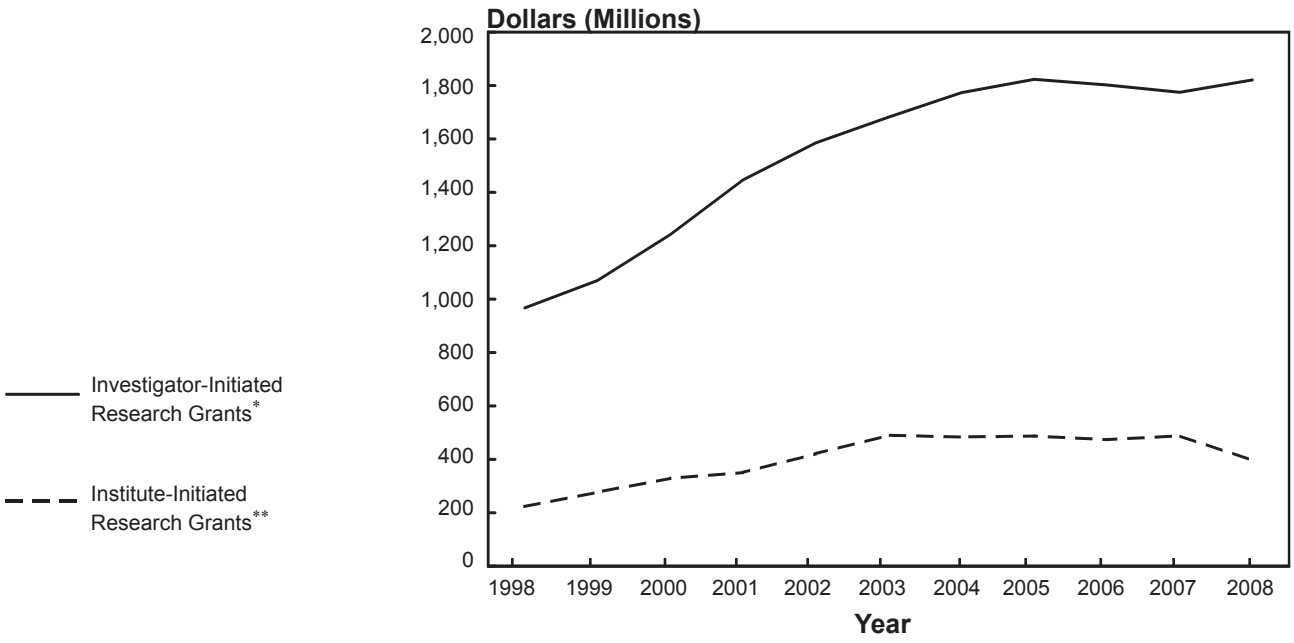
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Applications Reviewed	2,657	2,704	2,893	2,895	3,064	3,098	3,548	3,865	4,412	4,504	4,492
RPGs Awarded	837	959	1,003	1,033	1,018	1,064	1,034	909	871	943	997
Success Rate (percent)	31.5	35.5	34.7	35.7	33.2	34.3	29.1	23.5	19.7	20.9	22.2

* Includes R01, U01, P01, R03, R15, R21, R29, and R37; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

Percent of Reviewed Applications Funded (Success Rate)



NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1998–2008



* Includes RPGs, SBIRs/STTRs, Research Career Programs, and Other Research.
** Includes RPGs, Centers Grants, Research Career Programs, Other Research, and Cooperative Agreement RFAs.

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1998–2008

Dollars (Millions)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Investigator-Initiated*	$ 966.6	$1,069.9	$1,241.6	$1,446.2	$1,584.9	$1,681.9	$1,773.4	$1,822.9	$1,802.1	$1,774.8	$1,820.8
Institute-Initiated**	223.2	276.7	328.9	350.7	421.3	490.4	483.8	487.3	473.8	488.2	396.1
Total	**$1,189.8**	**$1,346.6**	**$1,570.5**	**$1,796.9**	**$2,006.2**	**$2,172.3**	**$2,257.2**	**$2,310.2**	**$2,275.9**	**$2,263.0**	**$2,216.9**

* Includes RPGs, SBIRs/STTRs, Research Career Programs, and Other Research.
** Includes RPGs, Centers Grants, Research Career Programs, Other Research, and Cooperative Agreement RFAs.

NHLBI Research Project Grants:* Amount Funded by Type of Award, Fiscal Years 1998–2008

Dollars (Millions)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Competing											
New Competing	$147.5	$ 202.0	$ 266.4	$ 280.0	$ 291.2	$ 285.5	$ 290.5	$ 270.0	$ 242.9	$ 330.9	$314.2
Renewal Competing	103.9	127.2	152.0	143.9	143.9	177.2	185.5	176.1	168.3	169.4	196.9
Competing Supplements	1.0	1.2	0.9	0.4	2.3	1.0	1.3	1.7	0.4	—	1.7
Subtotal, Competing	252.4	330.4	419.3	424.3	437.4	463.7	477.3	447.8	411.6	500.3	512.8
Noncompeting											
Subtotal, Noncompeting	721.3	770.6	889.3	1,101.5	1,281.3	1,390.3	1454.9	1,520.0	1,527.0	1,486.4	1,470.8
Total, Competing and Noncompeting	**$973.7**	**$1,101.0**	**$1,308.6**	**$1,525.8**	**$1,718.7**	**$1,854.0**	**$1,932.2**	**$1,967.8**	**$1,938.6**	**$1,986.7**	**$1,983.6**

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

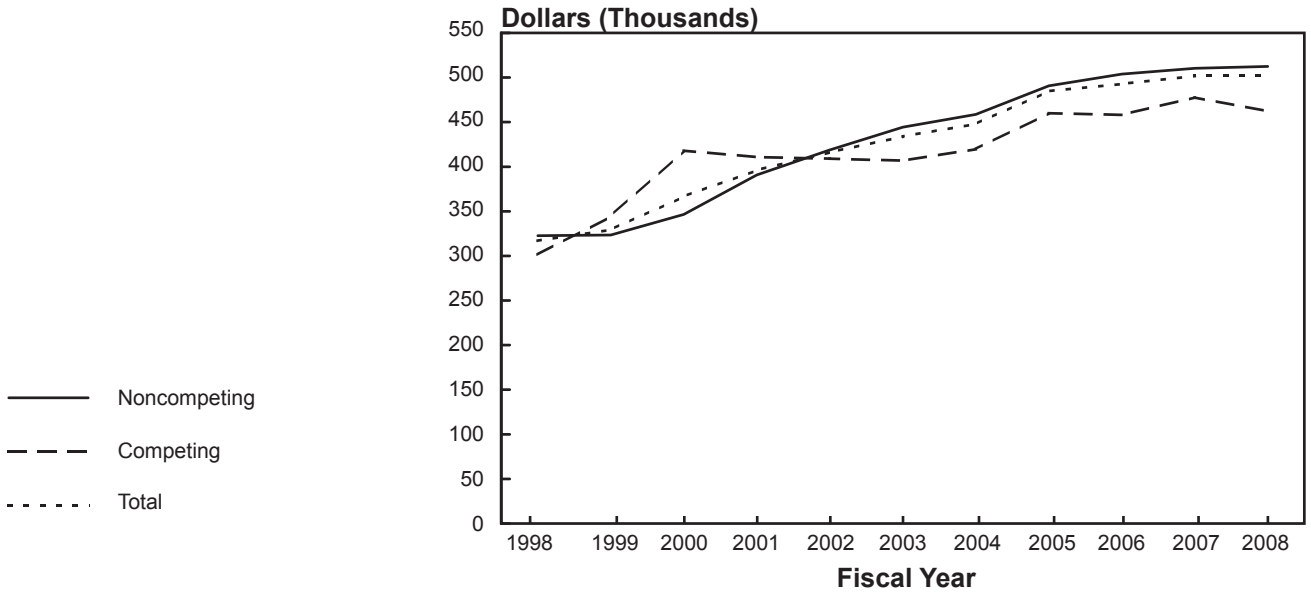
Facility and Administrative (F&A) Costs of NHLBI Research Project Grants:* Fiscal Years 1998–2008

Dollars (Thousands)

Fiscal Year	Direct Cost	F&A Cost	Total Cost	F&A Cost as a Percent of Direct Cost
1998	$ 660,009	$313,765	$ 973,774	47.5%
1999	764,198	336,756**	1,100,954	44.1
2000	891,244	417,312	1,308,556	46.8
2001	1,045,144	480,673	1,525,817	46.0
2002	1,182,408	536,324	1,718,732	45.4
2003	1,276,819	577,131	1,853,950	45.2
2004	1,329,106	603,133	1,932,239	45.4
2005	1,355,803	612,007	1,967,810	45.1
2006	1,334,406	604,183	1,938,589	45.3
2007	1,378,134	608,558	1,986,692	44.2
2008	1,376,276	607,357	1,983,633	44.1

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.
** Excludes Program Evaluation Assessment of $1,216,000.

NHLBI Research Project Grants:* Average Costs, Fiscal Years 1998–2008



* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

NHLBI Research Project Grants:* Average Costs, Fiscal Years 1998–2008

Dollars (Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Noncompeting	$322.6	$323.4	$346.6	$390.7	$418.8	$444.4	$458.7	$490.6	$503.9	$510.3	$512.4
Competing	301.6	344.5	418.0	410.8	409.1	406.7	419.7	459.9	458.1	477.8	462.0
Total	**$316.9**	**$329.4**	**$366.6**	**$396.1**	**$416.2**	**$433.8**	**$447.9**	**$484.8**	**$492.8**	**$501.7**	**$501.8**

* Includes R01, U01, P01, R03, R15, R21, R29, R37, R41, R42, R43, and R44; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

NHLBI Cooperative Agreements (U01, U10) Programs

Cooperative Agreements were instituted to support discrete, circumscribed projects in areas of an investigator's specific interest and competency with substantial programmatic participation by the NHLBI during performance of the activity.

	Total Obligations Prior to FY 2008	Total FY 2008 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
AIM HIGH: Niacin Plus Statin to Prevent Vascular Events	$ 13,005,383	$ 1,380,228	$ 14,385,611
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)	55,096,975	1,955,667	57,052,642
Cardiovascular Cell Therapy Research Network	4,424,183	7,568,262	11,992,445
Cardiovascular Heart Study (CHS) Events Follow-up Study	3,208,255	1,353,530	4,561,785
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)	18,144,173	3,269,101	21,413,274
Claudication Exercise vs. Edoluminal Revascularization	4,745,409	—	4,745,409
Clinical Research Consortium To Improve Resuscitation Outcomes	34,924,311	5,279,451	40,203,762
Community-Responsive Intervention To Reduce Cardiovascular Risk in American Indians and Alaska Natives	3,732,749	3,150,539	6,883,288
Design and Analysis of Genome-Wide Association Studies	3,538,913	1,759,053	5,297,966
Dynamic Evaluation of Percutaneous Coronary Intervention	6,180,419	748,083	6,928,502
Family Blood Pressure Program	96,943,741	661,448	97,605,189
Genetics of Coronary Artery Disease in Alaskan Natives (GOCADAN)	13,867,724	2,057,625	15,925,349
Heart Failure: A Controlled Trial Investigating Outcomes of Exercise Training (HF–ACTION)	36,964,599	652,481	37,617,080
Heart Failure Clinical Research Network	13,443,043	7,813,234	21,256,277
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care	25,650,639	—	25,650,639
Improved Measures of Diet and Physical Activity for the Genes and Environment Initiative	2,632,681	2,218,516	4,851,197
Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine	6,008,848	8,681,013	14,689,861
NHLBI Clinical Proteomics Program	14,945,281	1,697,669	16,642,950
Occluded Artery Trial (OAT)	18,676,892	1,276,603	19,953,495
Partnership Programs To Reduce Cardiovascular Health Disparities	28,259,603	7,021,298	35,280,901
Pediatric Heart Network	36,186,196	12,254,539	48,440,735
Pharmacogenetics Research Network	57,295,500	5,592,456	62,887,956
Practice-Based Opportunity for Weight Reduction (POWER) Trials	6,281,092	3,656,172	9,937,264
Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST)	6,779,823	662,200	7,442,023
Programs in Gene Environmental Interactions (PROGENI)	48,172,690	1,773,599	49,946,289
Programs of Excellence in Nanotechnology	28,546,460	10,975,656	39,522,116
Stop Atherosclerosis in Native Diabetics Study (SANDS)	11,276,341	217,817	11,494,158
Strong Heart Study	64,156,449	5,675,383	69,831,832
Surgical Treatment for Ischemic Heart Failure (STICH)	34,442,239	3,638,832	38,081,071
Weight Loss Maintenance (WLM)	17,318,900	145,082	17,463,982
Subtotal, Heart and Vascular Diseases	714,849,511	103,135,537	817,985,048
Lung Diseases			
Asthma Clinical Research Network (ACRN), Phase II	42,028,773	872,328	42,901,101
Centers for Reducing Asthma Disparities	27,350,819	145,000	27,495,819
Childhood Asthma Management Program–Continuation Study (CAMP-CS)/Phase III	2,077,278	1,965,954	4,043,232
Childhood Asthma Research and Education (CARE) Network	48,753,133	4,887,330	53,640,463
COPD Clinical Research Network	36,630,386	3,400,000	40,030,386
Early Antipseudomonal Therapy in Cystic Fibrosis	4,068,898	836,733	4,905,631
Genetic Epidemiology of COPD	6,113,536	8,120,487	14,234,023
Idiopathic Pulmonary Fibrosis Clinical Research Network	18,051,677	7,154,215	25,205,892

	Total Obligations Prior to FY 2008	Total FY 2008 Obligations	Total Obligations to Date
Lung Diseases (continued)			
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)	—	732,476	732,476
Pharmacogenetics of Asthma Treatment	20,685,719	3,127,710	23,813,429
Prospective Investigation of Pulmonary Embolism Diagnosis-III (PIOPED III)	8,161,984	3,265,909	11,427,893
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea	4,654,831	1,345,909	6,000,740
Sedation Management in Pediatric Patients With Acute Respiratory Failure	—	567,715	567,715
Study of Acid Reflux Therapy for Children With Asthma	1,620,787	841,425	2,462,212
Subtotal, Lung Diseases	220,197,821	37,263,191	257,461,012
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	43,195,601	6,951,519	50,147,120
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial	—	4,632,060	4,632,060
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial	—	2,070,898	2,070,898
Sickle Cell Disease Clinical Research Network	11,259,232	7,172,797	18,432,029
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)	10,808,766	3,828,227	14,636,993
Thalassemia (Cooley's Anemia) Clinical Research Network	19,405,539	2,600,482	22,006,021
Transfusion Medicine/Hemostasis Clinical Research Network	37,535,254	6,373,860	43,909,114
Subtotal, Blood Diseases and Resources	122,204,392	33,629,843	155,834,235
Total, NHLBI Cooperative Agreements	**$1,057,251,724**	**$174,028,571**	**$1,231,280,295**

Heart and Vascular Diseases Program

AIM HIGH: Niacin Plus Statin To Prevent Vascular Events, Initiated in Fiscal Year 2005

The purpose of this multicenter clinical trial is to determine whether extended-release niacin plus simvastatin is superior to simvastatin alone for preventing or delaying a major CVD event in patients with atherogenic dyslipidemia. Niacin is used to raise HDL ("good") cholesterol and simvastatin is used to lower LDL ("bad") cholesterol. Twenty-seven percent of the population will be from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$1,380,228
Fiscal Years 2005–2007— $13,005,383
Total Funding to Date—$14,385,611

Current Active Organizations and Grant Numbers

1. University of Washington
Seattle, Washington —HL-081616
2. AXIO Research, LLC
Seattle, Washington —HL-081649

Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D), Initiated in Fiscal Year 2000

The purpose of this trial is to compare alternative treatment strategies for managing patients with type 2 diabetes with angiographically proven coronary artery disease and stable angina or ischemia. Revascularization combined with aggressive medical anti-ischemia treatment is being compared to aggressive medical anti-ischemia treatment alone; simultaneously, researchers seek to determine whether insulin-sensitizing drugs such as metformin and the glitazones for controlling blood sugar level offer any survival advantage over drugs that increase insulin level. Thirty-three percent of the patients are from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$1,955,667
Fiscal Years 2000–2007—$55,096,975
Total Funding to Date—$57,052,642

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-061744
2. St. Louis University
St. Louis, Missouri —HL-061746
3. Stanford University
Stanford, California —HL-061748

Cardiovascular Cell Therapy Research Network, Initiated in Fiscal Year 2007

See Chapter 11. Clinical Trials.

Cardiovascular Heart Study (CHS) Events Follow-Up Study, Initiated in Fiscal Year 2005

The purpose of this project is to continue follow-up of the CHS cohort for cardiovascular events in order to enhance power among subgroups to study associations of CVD risk factors and incidence and prognosis following CVD events in older adults. The additional events will permit greater opportunity to address the study aims by CHS investigators and other researchers interested in making use of the study's extensive database and specimens. Seventeen percent of the participants are from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$1,353,530
Fiscal Years 2005–2007—$3,208,255
Total Funding to Date—$4,561,785

Current Active Organization and Grant Number

1. University of Washington
Seattle, Washington —HL-080295

Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL), Initiated in Fiscal Year 2004

The purpose of this trial is to determine whether revascularization of a stenotic renal artery plus medical therapy is associated with improved clinical outcomes compared with medical therapy alone. Twenty-three percent of the participants will be from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$3,269,101
Fiscal Years 2004–2007—$18,144,173
Total Funding to Date—$21,413,274

Current Active Organizations and Grant Numbers

1. University of Toledo Health Sciences Campus
   Toledo, Ohio —HL-071556
2. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-072734
3. University of Virginia
   Charlottesville, Virginia —HL-072735
4. Mid-America Heart Institute of St. Luke Hospital
   Kansas City, Missouri —HL-072736
5. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL-072737

Claudication Exercise vs. Edoluminal Revascularization, Initiated in Fiscal Year 2005

The purpose of this study is to test the hypothesis that a strategy of aortoiliac stenting and pharmacotherapy improves maximum walking duration better than a strategy of supervised rehabilitation, exercise, and pharmacotherapy for those with aortoiliac artery obstruction at 6 months. Other objectives are to compare the two treatment groups with a third group, usual care and pharmacotherapy, at 6 months, and to compare maximum walking duration change scores at 18 months, changes in free living daily activity levels, and patient-perceived quality of life among all three groups.

Obligations

Funding History:
Fiscal Year 2008—$0
Fiscal Years 2005–2007—$4,745,409
Total Funding to Date—$4,745,409

Current Active Organizations and Grant Numbers

1. Rhode Island Hospital
   Providence, Rhode Island —HL-077221
2. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL-081656

Clinical Research Consortium To Improve Resuscitation Outcomes, Initiated in Fiscal Year 2004

See Chapter 11. Clinical Trials.

Community-Responsive Intervention To Reduce Cardiovascular Risk in American Indians and Alaska Natives, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Design and Analysis of Genome-Wide Association Studies, Initiated in Fiscal Year 2006

The purpose of this program is to develop and test innovative, informative, and cost-effective study designs and analytical strategies to perform genome-wide association studies on complex diseases. Strategies and tools developed through the program will be made available to the scientific community.

Obligations

Funding History:
Fiscal Year 2008—$1,759,053
Fiscal Years 2006–2007—$3,538,913
Total Funding to Date—$5,297,966

Current Active Organizations and Grant Numbers

1. University of Chicago
   Chicago, Illinois —HL-084689
2. Cornell University Ithaca
   Ithaca, New York —HL-084706
3. University of Chicago
   Chicago, Illinois —HL-084715
4. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HL-084729
5. University of Maryland, Baltimore
   Baltimore, Maryland —HL-084756
6. Translational Genomics Research Institute
   Phoenix, Arizona —HL-086528

Dynamic Evaluation of Percutaneous Coronary Intervention, Initiated in Fiscal Year 1997

This program, which complements prior NHLBI percutaneous transluminal coronary angioplasty (PTCA) registries and the New Approaches to Coronary Intervention Registry, is evaluating patterns of device usage, as well as immediate and follow-up outcomes in patients undergoing percutaneous transluminal coronary revascularization. Results will provide guidance to the cardiology community in selecting appropriate therapies and in designing clinical trials to evaluate competing devices.

Obligations

Funding History:
Fiscal Year 2008—$748,083
Fiscal Years 1997–2007—$6,180,419
Total Funding to Date—$6,928,502

Current Active Organization and Grant Number

1. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-033292

Family Blood Pressure Program, Initiated in Fiscal Year 1995

The objectives of this program are to identify major genes associated with high blood pressure and to investigate the interactions between genetic and environmental determinants of hypertension in defined populations, many of which consist of specific minority groups. The study consists of collaborative networks that share technology, data, skills, biological materials, and population resources.

Obligations

Funding History:
Fiscal Year 2008—$661,448
Fiscal Years 1995–2007—$96,943,741
Total Funding to Date—$97,605,189

Current Active Organizations and Grant Numbers

1. University of Utah
   Salt Lake City, Utah —HL-054471
2. Washington University
   St. Louis, Missouri —HL-054473
3. University of Texas
   Health Science Center
   Houston, Texas —HL-054481
4. Pacific Health Research Institute
   Honolulu, Hawaii —HL-054498
5. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HL-054512

Genetics of Coronary Artery Disease in Alaska Natives (GOCADAN), Initiated in Fiscal Year 2000

The purpose of this study is to document CVD and CVD risk factors in approximately 40 extended families (1,214 members from villages in Northern Alaska). Scientists seek to identify and characterize genes that contribute to CVD in this unique and understudied population.

Obligations

Funding History:
Fiscal Year 2008—$2,057,625
Fiscal Years 2000–2007—$13,867,724
Total Funding to Date—$15,925,349

Current Active Organizations and Grant Numbers

1. MedStar Research Institute
   Hyattsville, Maryland —HL-064244
2. Norton Sound Health Corporation
   Nome, Alaska —HL-082458
3. Southwest Foundation for
   Biomedical Research
   San Antonio, Texas —HL-082490

Heart Failure: A Controlled Trial Investigating Outcomes of Exercise (HF-ACTION), Initiated in Fiscal Year 2002

The purpose of this trial is to determine the long-term safety and effectiveness of exercise training for patients with heart failure. Patients receiving the exercise regimen also will receive standard care and will be compared with patients receiving standard care alone. Thirty-eight percent of the participants are from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$652,481
Fiscal Years 2002–2007—$36,964,599
Total Funding to Date—$37,617,080

Current Active Organization and Grant Number

1. Duke University
   Durham, North Carolina —HL-063747

Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care, Initiated in Fiscal Year 2004

The purpose of this program is to study the effects of early administration of glucose, insulin, and potassium (GIK) in reducing mortality in patients from acute coronary syndrome (ACS). Patients experiencing an ACS (including AMI and unstable angina pectoris) will be treated with GIK as soon as possible in prehospital emergency medical service settings or immediately upon arrival for those presenting to emergency departments.

Obligations

Funding History:
Fiscal Year 2008—$0
Fiscal Years 2004–2007—$25,650,639
Total Funding to Date—$25,650,639

Current Active Organizations and Grant Numbers

1. Tufts Medical Center
   Boston, Massachusetts —HL-077821
2. State University of New York
   Stony Brook, New York —HL-077822
3. Tufts Medical Center
   Boston, Massachusetts —HL-077823
4. Tufts Medical Center
   Boston, Massachusetts —HL-077826

Improved Measures of Diet and Physical Activity for the Genes and Environment Initiative, Initiated in Fiscal Year 2007

The purpose of this program is to support the development of technology to make precise, quantitative measurements of personal exposure to environmental chemical or biological agents, diet, physical activity, and psychosocial stress.

Obligations

Funding History:
Fiscal Year 2008—$2,218,516
Fiscal Year 2007—$2,632,681
Total Funding to Date—$4,851,197

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-091736
2. Massachusetts Institute of Technology
   Cambridge, Massachusetts —HL-091737
3. Princeton Multimedia Technologies Corporation
   Princeton, New Jersey —HL-091738

Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine, Initiated in Fiscal Year 2007

See Chapter 11. Clinical Trials.

NHLBI Clinical Proteomics Program, Initiated in Fiscal Year 2005

The purpose of this program is to promote systematic, comprehensive, large-scale validation of existing and new candidate protein markers that are appropriate for routine use in the diagnosis and management of heart, lung, and blood diseases and sleep disorders. The Program will facilitate validation of protein panels that may be used to predict disease susceptibility or to assist in differential diagnosis, disease staging, selection of individualized therapies, or monitoring of treatment responses. It will also establish a high-quality education and skills development program to ensure that scientists develop the expertise needed to address the complex, multifaceted challenges in clinical proteomics.

Obligations

Funding History:
Fiscal Year 2008—$1,697,669
Fiscal Years 2005–2007—$14,945,281
Total Funding to Date—$16,642,950

Current Active Organizations and Grant Numbers

1. Mayo Clinic College of Medicine
   Rochester, Minnesota —HL-081331
2. Vanderbilt University
   Nashville, Tennessee —HL-081332
3. University of Colorado
   Denver, Colorado —HL-081335
4. Massachusetts General Hospital
   Boston, Massachusetts —HL-081341

Occluded Artery Trial (OAT), Initiated in Fiscal Year 1999

The purpose of this study is to determine whether percutaneous revascularization to open an occluded artery within a few days or as long as a month following an acute MI in asymptomatic patients improves their outcome. Although the benefits of early restoration of blood flow following an acute MI have been well-established, it is not known whether later intervention is also beneficial. The trial is in its follow-up phase.

Obligations

Funding History:
Fiscal Year 2008—$1,276,603
Fiscal Years 1999–2007—$18,676,892
Total Funding to Date—$19,953,495

Current Active Organizations and Grant Numbers

1. New York University School of Medicine
   New York, New York —HL-062509
2. Maryland Medical Research Institute, Inc
   Baltimore, Maryland —HL-062511

Partnership Programs To Reduce Cardiovascular Health Disparities, Initiated in Fiscal Year 2004

The objectives of this study are to improve the provider and patient approaches to treatment of hypertension and diabetes, modify physician-related barriers to minority enrollment in clinical trials, improve patient adherence to treatment plans, and build sustainable research programs at minority-serving institutions.

Obligations

Funding History:
Fiscal Year 2008—$7,021,298
Fiscal Years 2004–2007—$28,259,603
Total Funding to Date—$35,280,901

Current Active Organizations and Grant Numbers

1. Bon Secours Hospital Baltimore, Inc.
   Baltimore, Maryland —HL-079150
2. University of Maryland
   Baltimore Professional School
   Baltimore, Maryland —HL-079151
3. Queen's Medical Center
   Honolulu, Hawaii —HL-079152
4. Cooper Green Hospital
   Birmingham, Alabama —HL-079153
5. Emory University
   Atlanta, Georgia —HL-079156
6. Denver Health and Hospital Authority
   Denver, Colorado —HL-079160
7. University of Hawaii at Manoa
   Honolulu, Hawaii —HL-079163
8. University of Alabama at Birmingham
   Birmingham, Alabama —HL-079171
9. University of Colorado
   Health Sciences Center
   Denver, Colorado —HL-079208
10. Morehouse School of Medicine
    Atlanta, Georgia —HL-079214
11. Jackson Hinds Comprehensive
    Health Center
    Jackson, Mississippi —HL-079378
12. University of Mississippi
    Medical Center
    Jackson, Mississippi —HL-079458

Pediatric Heart Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Pharmacogenetics Research Network, Initiated in Fiscal Year 2001

The purpose of this study is to establish a network to systematically evaluate candidate genes that may influence pharmacologic response to drug treatments for arrhythmia, heart failure, hypertension, and lipid disorders. Investigators seek to identify gene polymorphisms capable of predicting drug toxicity and efficacy. One of the projects has 38 percent minority participation.

Obligations

Funding History:
Fiscal Year 2008—$5,592,456
Fiscal Years 2001–2007—$57,295,500
Total Funding to Date—$62,887,956

Current Active Organizations and Grant Numbers

1. Vanderbilt University
   Nashville, Tennessee —HL-065962
2. Children's Hospital and Research Center
   Oakland, California —HL-069757
3. Stanford University
   Stanford, California —GM-061374

Practice-Based Opportunity for Weight Reduction (POWER) Trials,* Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST), Initiated in Fiscal Year 2003

The purpose of this study is to compare the effects of four diets low in saturated fat and differing in macronutrient composition on weight loss and its maintenance in 800 overweight or obese adults. The diet consists of moderate fat (40 percent energy) or low fat (20 percent energy) with two different protein levels (15 and 25 percent). Seventeen percent of the participants are from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$662,200
Fiscal Years 2003–2007—$6,779,823
Total Funding to Date—$7,442,023

* Formerly known as Weight-Loss in Obese Adults With Cardiovascular Risk Factors.

Current Active Organization and Grant Number

1. Harvard School of Public Health
   Boston, Massachusetts —HL-073286

Programs in Gene Environmental Interactions (PROGENI),* Initiated in Fiscal Year 2002

The purpose of this study is to identify novel genes that interact with specific environmental exposures to modify risk factors for heart, lung, and blood diseases and sleep disorders. The genetic aspects of response to environmental change and related biological mechanisms will be studied using short-term, focused interventions in black families. Subgroups will be identified based on genotypes that are most likely to benefit from targeted environmental changes designed to reduce the development or progression of heart, lung, and blood diseases or sleep disorders.

Obligations

Funding History:
Fiscal Year 2008—$1,773,599
Fiscal Years 2002–2007—$48,172,690
Total Funding to Date—$49,946,289

Current Active Organizations and Grant Numbers

1. Tulane University
   New Orleans, Louisiana —HL-072507
2. University of Maryland
   Baltimore Professional School
   Baltimore, Maryland —HL-072515
3. Johns Hopkins University
   Baltimore, Maryland —HL-072518
4. University of Alabama at Birmingham
   Birmingham, Alabama —HL-072524

Programs of Excellence in Nanotechnology, Initiated in Fiscal Year 2005

The purpose of this program is to establish multidisciplinary teams to develop nanotechnology and biomolecular engineering tools and methodologies to detect and analyze atherosclerotic plaque formation. The program presents an unique opportunity for research collaboration and skills training by bring bioengineering and nanotechnology solutions into medicine and vice versa.

Obligations

Funding History:
Fiscal Year 2008—$10,975,656
Fiscal Years 2005–2007—$28,546,460
Total Funding to Date—$39,522,116

Current Active Organizations and Grant Numbers

1. Emory University
   Atlanta, Georgia —HL-080711
2. Burnham Institute for Medical Research
   La Jolla, California —HL-080718
3. Washington University
   St. Louis, Missouri —HL-080729
4. Massachusetts General Hospital
   Boston, Massachusetts —HL-080731

Stop Atherosclerosis in Native Diabetics Study (SANDS), Initiated in Fiscal Year 2002

This study will address the high incidence of CVD in American Indians who have a high prevalence of diabetes, but relatively low levels of LDL cholesterol and blood pressure. It will compare aggressive lowering of LDL cholesterol and blood pressure to the usual care standard.

After 3 years of therapy, aggressive reduction of SBP and LDL-C resulted in regression of carotid artery intimal medial thickness (CIMT), whereas progression of CIMT was seen in the standard treatment group. In addition, a greater reduction of left ventricular mass was observed in the aggressively treated group. Further followup is planned to determine whether these improvements in subclinical cardiovascular endpoints will result in lower long-term cardiovascular event rates and favorable benefit-risk ratios.

Obligations

Funding History:
Fiscal Year 2008—$217,817
Fiscal Years 2002–2007— $11,276,341
Total Funding to Date—$11,494,158

Current Active Organization and Grant Number

1. MedStar Research Institute
   Hyattsville, Maryland —HL-067031

* Formerly known as Interaction of Gene and Environment in Shaping Risk Factors for Heart, Lung, and Blood Diseases and Sleep Disorders.

Strong Heart Study, Initiated in Fiscal Year 1988

The objectives of this study are to survey CVD morbidity and mortality rates among three geographically diverse groups of American Indians and to estimate their levels of CVD risk factors. Phases II and III of the cohort study extended surveillance of community mortality and assessed development of CVD and changes in CVD risk factors. In Phase III, investigators added a substudy of asthma and a pilot family study. Phase IV expanded the family study to 120 families comprising 3,600 members to investigate genetic and environmental contributors of CVD. Phase V will examine the family study cohort to assess genetic relationships to risk factor change over a 5-year period.

Obligations

Funding History:
Fiscal Year 2008—$5,675,383
Fiscal Years 1988–2007—$64,156,449
Total Funding to Date—$69,831,832

Current Active Organizations and Grant Numbers

1. MedStar Research Institute
   Hyattsville, Maryland —HL-041642
2. Missouri Breaks Research, Inc.
   Timberlake, South Dakota —HL-041652
3. University of Oklahoma
   Health Sciences Center
   Oklahoma City, Oklahoma —HL-041654
4. Southwest Foundation for
   Biomedical Research
   San Antonio, Texas —HL-065520
5. Weill Medical College of
   Cornell University
   New York, New York —HL-065521

Surgical Treatment for Ischemic Heart Failure (STICH), Initiated in Fiscal Year 2002

The purpose of this clinical trial is to determine whether CABG plus intensive medical therapy improves long-term survival of patients with heart failure and left ventricular (LV) dysfunction who have coronary artery disease amenable to surgical revascularization, compared to medical therapy alone; and to determine whether CABG plus surgical ventricular restoration to a more normal LV size improves survival free of subsequent hospitalizations of patients with anterior LV dysfunction, compared to CABG alone.

Obligations:

Funding History:
Fiscal Year 2008—$3,638,832
Fiscal Years 2002–2007—$34,442,239
Total Funding to Date—$38,081,071

Current Active Organizations and Grant Numbers

1. Thomas Jefferson University
   Philadelphia, Pennsylvania —HL-069009
2. Mayo Clinic College of Medicine
   Rochester, Minnesota —HL-069010
3. Duke University
   Durham, North Carolina —HL-069011
4. Northwestern University
   Chicago, Illinois —HL-069012
5. Duke University
   Durham, North Carolina —HL-069013
6. Duke University
   Durham, North Carolina —HL-069015
7. University of Southern California
   Los Angeles, California —HL-072683

Weight Loss Maintenance (WLM), Initiated in Fiscal Year 2003

The purpose of this multicenter trial is to evaluate the effectiveness of two strategies to maintain weight loss for 2½ years in approximately 800 overweight or obese adults. Individuals who are taking medication for hypertension of dyslipidemia or who are diabetic enter a 6-month weight program. Those who lose at least 9 pounds are randomized into one of three groups: one that provides monthly personal contacts with a trained interventionist, primarily by telephone; one that provides frequent contacts through an interactive Web-based program; or usual care. Forty percent of the participants will be black.

Obligations

Funding History:
Fiscal Year 2008—$145,082
Fiscal Years 2003–2007—$17,318,900
Total Funding to Date—$17,463,982

Current Active Organization and Grant Number

1. Kaiser Foundation Research Institute
   Oakland, California —HL-068676

Lung Diseases Program

Asthma Clinical Research Network (ACRN) Phase II, Initiated in Fiscal Year 2003

See Chapter 11. Clinical Trials.

Centers for Reducing Asthma Disparities, Initiated in Fiscal Year 2002

The purpose of this study is to establish cooperative centers of research to reduce asthma disparities between whites and minorities and economically disadvantaged populations. The mission of the centers, comprising partnerships between minority-servicing medical institutions and research-intensive institutions, is to promote interdisciplinary investigation of factors that contribute to disparities in asthma, accelerate development and evaluation of strategies to promote effective asthma management among minority and economically disadvantaged populations, encourage training and career development for minority clinical research investigators, and improve the effectiveness of NHLBI-supported research-intensive institutions in developing and sustaining culturally appropriate research and demonstration activities on reducing disparities.

Obligations

Funding History:
Fiscal Year 2008—$145,000
Fiscal Years 2002–2007—$27,350,819
Total Funding to Date—$27,495,819

Current Active Organizations and Grant Numbers

1. Rhode Island Hospital
   Providence, Rhode Island —HL-072438
2. Hektoen Institute for Medical Research
   Chicago, Illinois —HL-072496

Childhood Asthma Management Program–Continuation Study (CAMP–CS)/Phase III, Initiated in Fiscal Year 2007

The objective of this observational study is to follow the original CAMP cohort for 4 more years (through ages 21–29) to determine clinical and genetic risk factors for patterns of lung function decline indicative of chronic air flow obstruction in later adulthood; 31 percent of the participants are from minority groups.

Obligations

Funding History:
Fiscal Year 2008—$1,965,954
Fiscal Year 2007—$2,077,278
Total Funding to Date—$4,043,232

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-075232
2. Hospital for Sick Children
   Toronto, Ontario —HL-075407
3. Johns Hopkins University
   Baltimore, Maryland —HL-075408
4. Asthma, Inc.
   Seattle, Washington —HL-075409
5. University of California, San Diego
   La Jolla, California —HL-075415
6. National Jewish Medical and Research Center
   Denver, Colorado —HL-075416
7. Johns Hopkins University
   Baltimore, Maryland —HL-075417
8. Brigham and Women's Hospital
   Boston, Massachusetts —HL-075419
9. University of New Mexico
   Albuquerque, New Mexico —HL-075420

Childhood Asthma Research and Education (CARE) Network, Initiated in Fiscal Year 1999

See Chapter 11. Clinical Trials.

COPD Clinical Research Network, Initiated in Fiscal Year 2003

See Chapter 11. Clinical Trials.

Early Antipseudomonal Therapy in Cystic Fibrosis, Initiated in Fiscal Year 2004

The purpose of this study is to determine a safe, effective, and systematic approach for treating young children (ages 1 to 12 years) with CF who are found to be infected with *Pseudomonas aemginosa* (Pa). The goal is to intervene with antipseudomonal therapy at the first isolation of Pa to delay or prevent chronic infections that lead to irreversible lung destruction.

Obligations

Funding History:
Fiscal Year 2008—$836,733
Fiscal Years 2004–2007—$4,068,898
Total Funding to Date—$4,905,631

Current Active Organization and Grant Number

1. Children's Hospital and Regional Medical Center
Seattle, Washington —HL-080310

Genetic Epidemiology of COPD, Initiated in Fiscal Year 2007

The purpose of this study is to perform a genome-wide association analysis to identify the genetic risk factors that determine susceptibility for COPD and COPD-related phenotypes in a large biracial population.

Obligations

Funding History:
Fiscal Year 2008—$8,120,487
Fiscal Year 2007—$6,113,536
Total Funding to Date—$14,234,023

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-089856
2. National Jewish Medical and Research Center
Denver, Colorado —HL-089897

Idiopathic Pulmonary Fibrosis Clinical Research Network, Initiated in Fiscal Year 2005

See Chapter 11. Clinical Trials.

Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS), Initiated in Fiscal Year 2008

The purpose of this randomized clinical trial is to assess the efficacy and safety of 7 percent hypertonic saline (HS) inhaled twice daily for 48 weeks among infants with CF 4 to 15 months of age at enrollment. In short-term studies, HS has been shown to improve mucociliary clearance and in long-term studies, to improve lung function, decrease the rate of pulmonary exacerbations, and improve quality of life in patients with CF over 6 years of age. The ISIS will examine infants at enrollment and weeks 4, 12, 24, 36, and 48. Subjects will undergo lung function testing at enrollment and 24 and 48 weeks. The primary endpoint is the change in the functional residual capacity, a measure of hyperinflation, from baseline to end of treatment. Additional lung function measures will also be assessed.

Obligations

Funding History:
Fiscal Year 2008—$732,476
Total Funding to Date—$732,476

Current Active Organizations and Grant Numbers

1. Children's Hospital and Regional Medical Center
Seattle, Washington —HL-092931
2. University of Washington
Seattle, Washington —HL-092932

Pharmacogenetics of Asthma Treatment, Initiated in Fiscal Year 2000

The objective of this project is to bring together research experts in asthma, epidemiology, statistics, bioinformatics, physiology, clinical trials, genetics, and genomics to focus on the pharmacogenetics of asthma treatment.

Obligations

Funding History:
Fiscal Year 2008—$3,127,710
Fiscal Years 2000–2007— $20,685,719
Total Funding to Date—$23,813,429

Current Active Organization and Grant Number

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-065899

Prospective Investigation of Pulmonary Embolism Diagnosis III (PIOPED III), Initiated in Fiscal Year 2005

The purpose of this study is to determine the diagnostic accuracy of gadolinium-enhanced magnetic resonance angiography of the pulmonary arteries in combination with magnetic resonance venography of the lower extremities for the detection of acute venous thromboembolic disease.

Obligations

Funding History:
Fiscal Year 2008—$3,265,909
Fiscal Years 2005–2007—$8,161,984
Total Funding to Date—$11,427,893

Current Active Organizations and Grant Numbers

1. Massachusetts General Hospital
   Boston, Massachusetts —HL-077149
2. University of Michigan
   Ann Arbor, Michigan —HL-077150
3. University of Calgary
   Calgary, Alberta —HL-077151
4. Emory University
   Atlanta, Georgia —HL-077153
5. Washington University
   St. Louis, Missouri —HL-077154
6. George Washington University
   Washington, DC —HL-077155
7. St. Joseph Mercy-Oakland
   Pontiac, Michigan —HL-077358
8. New York University
   New York, New York —HL-081593
9. St. Joseph Mercy-Oakland
   Pontiac, Michigan —HL-081594

Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea, Initiated in Fiscal Year 2006

The purpose of this randomized controlled study is to compare adenotonsillectomy and watchful waiting followed by re-evaluation after 7 months for treatment of OSA in children aged 5 to 9 years; 50 percent of the participants will be black.

Obligations

Funding History:
Fiscal Year 2008—$1,345,909
Fiscal Years 2006–2007—$4,654,831
Total Funding to Date—$6,000,740

Current Active Organizations and Grant Numbers

1. Case Western Reserve University
   Cleveland, Ohio —HL-083075
2. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-083129

Sedation Management in Pediatric Patients With Acute Respiratory Failure, Initiated in Fiscal Year 2008

The purpose of this randomized clinical trial is to test an innovative approach to sedation management in a pediatric population; 40 percent of the participants will be from minority populations. The approach involves team education and consensus on the use of sedatives in patients support on mechanical ventilation; team identification of the patient's trajectory of illness and daily prescription of a sedation goal; nurse-implemented goal-directed comfort algorithm that guides moment-to-moment titration of opioids and benzodiazepines; and team feedback on sedation management performance.

Obligations

Funding History:
Fiscal Year 2008—$567,715
Total Funding to Date—$567,715

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-086622
2. Children's Hospital Boston
   Boston, Massachusetts —HL-086649

Study of Acid Reflux Therapy for Children With Asthma, Initiated in Fiscal Year 2006

The purpose of this randomized controlled clinical trial is to investigate whether an approved proton-pump inhibitor lansoprazole will reduce asthma exacerbations in children with poorly controlled asthma, ages 6–16 years. Thirty percent of the participants will be from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$841,425
Fiscal Years 2006–2007—$1,620,787
Total Funding to Date—$2,462,212

Current Active Organizations and Grant Numbers

1. Emory University
   Atlanta, Georgia —HL-080433
2. Johns Hopkins University
   Baltimore, Maryland —HL-080450

Blood Diseases and Resources

Blood and Marrow Transplant Clinical Research Network, Initiated in Fiscal Year 2001

See Chapter 11. Clinical Trials.

Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial, Initiated in Fiscal Year 2008

The purpose of this trial is to determine in patients with atrial fibrillation who are on chronic warfarin therapy whether the current practice of providing low molecular weight heparin as a "bridge" before and after elective surgery (time when warfarin is suspended) is efficacious. A randomized clinical trial of 3,282 patients with atrial fibrillation will receive either therapeutic dose of low molecular weight heparin or a matching placebo before and after surgery (1,641 patients per arm); 32 percent of the participants are expected to come from minority populations. Primary efficacy outcome is arterial thromboembolism (stroke, transient ischemic attack, or systemic embolism), and primary safety outcome is major bleeding (symptomatic, clinically overt, or fatal). Researchers seek to demonstrate that "no bridging" has a risk for arterial thromboembolism equal to a bridging strategy.

Obligations

Funding History:
Fiscal Year 2008—$4,632,060
Total Funding to Date—$4,632,060

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-86755
2. Duke University
   Durham, North Carolina —HL-87229

Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial, Initiated in Fiscal Year 2008

The purpose of the ATTRACT (Acute Venous Thrombosis: Thrombus Removal With Adjunct Catheter-Directed Thrombolysis) Trial is to determine whether pharmacomechanical catheter-directed thrombolysis (i.e., thrombus removal) can prevent post-thrombotic syndrome, a common complication in patients with deep vein thrombosis; 25 percent of the participants are expected to come from minority populations. Although the procedure, which is costly and potentially risky, has been demonstrated to be effective in a small selected sample population, it is not known whether it should be routinely used as the first-line treatment of acute proximal deep vein thrombosis. Research findings will greatly improve clinical practice and decrease morbidity in patients with acute deep vein thrombosis, a cornmon blood disorder.

Obligations

Funding History:
Fiscal Year 2008—$2,070,898
Total Funding to Date—$2,070,898

Current Active Organizations and Grant Numbers

1. McMaster University
   Hamilton, Ontario —HL-088118
2. Washington University
   St. Louis, Missouri —HL-088476

Sickle Cell Disease Clinical Research Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

Stroke With Transfusions Changing to Hydroxyurea (SWITCH), Initiated in Fiscal Year 2005

The purpose of this Phase III clinical trial is to compare standard therapy (transfusions and chelation) with alternative therapy (hydroxyurea and phlebotomy) for the prevention of secondary stroke and management of iron overload in children with sickle cell anemia. Additional objectives include comparisons of growth and development, frequency of nonstroke neurological and other sickle-related events, and quality of life. The patient population will be black.

Obligations

Funding History:
Fiscal Year 2008—$3,828,227
Fiscal Years 2005–2007—$10,808,766
Total Funding to Date—$14,636,993

Current Active Organizations and Grant Numbers

1. St. Jude Children's Research Hospital
   Memphis, Tennessee —HL-078787
2. Rho Federal Systems Division, Inc.
   Chapel Hill, North Carolina —HL-078987

Thalassemia (Cooley's Anemia) Clinical Research Network

See Chapter 11. Clinical Trials.

Transfusion Medicine/Hemostasis Clinical Research Network, Initiated in Fiscal Year 2002

See Chapter 11. Clinical Trials.

NHLBI Research Centers (P50) Programs

Specialized Centers of Clinically Oriented Research (P50) and Centers of Excellence in Translational Human Stem Cell Research (P50) Programs

The NHLBI initiated the Specialized Centers of Research (SCOR) program in 1971 to encourage translational research—converting basic science findings to the clinic—in high priority areas. The SCOR concept emphasized multidisciplinary research (i.e., basic science and clinical investigations) on diseases relevant to the Institute's mission. In 2002, the NHLBI revised the SCOR program—primarily on recommendation from the NHLBAC—to place more emphasis on clinical research projects. The SCCOR program still requires clinical and basic scientists to work together on a unified theme, but now requires at least 50 percent of the projects to be clinical. The SCOR program ended in 2008.

The Centers of Excellence in Translational Human Stem Cell Research program was initiated in 2005 to accelerate the translation of basic scientific discoveries in human stem cell biology to new treatments for patients. Listed below is the funding history for the individual SCCORs and Centers of Excellence supported by the Institute.

		Obligations (Dollars in Thousands)		
Area of Concentration	**Period of Operation**	**Prior to FY 2008**	**FY 2008**	**Total to Date**
Heart and Vascular Diseases Program				
Cardiac Dysfunction and Disease (SCCOR)	2005–	$ 50,097	$15,352	$ 65,449
Pediatric Heart Development and Disease (SCCOR)	2004–	51,830	12,047	63,877
Vascular Injury, Repair, and Remodeling (SCCOR)	2006–	30,248	14,426	44,674
Subtotal, Heart and Vascular Diseases Program		132,175	41,825	174,000
Lung Diseases Program				
Chronic Obstructive Pulmonary Disease (SCCOR)	2007–	11,276	10,960	22,236
Host Factors in Chronic Lung Diseases (SCCOR)	2006–	15,807	8,058	23,865
Pulmonary Vascular Disease (SCCOR)	2007–	6,379	6,353	12,732
Subtotal, Lung Diseases Program		216,540	25,371	241,911
Blood Diseases and Resources Program				
Hemostatic and Thrombotic Diseases (SCCOR)	2006–	16,065	8,076	24,141
Transfusion Biology and Medicine (SCCOR)	2005–	13,284	4,534	17,818
Subtotal, Blood Diseases and Resources Program		29,349	12,610	41,959
Total, Specialized Centers of Research (P50)		378,064	79,806	457,870
Centers of Excellence in Translational Human Stem Cell Research	2005–	5,537	1,383	6,920
Subtotal, Centers of Excellence in Translational Human Stem Cell Research		5,537	1,383	6,920
Total, (P50)		**$383,601**	**$81,189**	**$464,790**

Heart and Vascular Diseases Program

Cardiac Dysfunction and Disease

The purpose of this SCCOR is to foster multidisciplinary research on clinically relevant questions related to dysfunction and disease of the myocardium. The program will enable rapid application of basic science findings to the prevention, diagnosis, and treatment of cardiac disorders, including ischemic and other cardiomyopathies, left ventricular dysfunction, metabolic abnormalities, heart failure, and rhythm disturbances. Because some segments of the population disproportionately suffer from heart disease, research that addresses issues of health disparity will be emphasized.

Obligations

Fiscal Year 2008—$15,352,102

Current Active Organizations and Grant Numbers

1. Columbia University
   Health Science Center
   New York, New York —HL-077096
2. University of Alabama at Birmingham
   Birmingham, Alabama —HL-077100
3. University of Cincinnati
   Cincinnati, Ohio —HL-077101
4. Cleveland Clinical Lerner College
   Cleveland, Ohio —HL-077107
5. Washington University
   St. Louis, Missouri —HL-077113

Pediatric Heart Development and Disease

The purpose of this SCCOR is to foster multidisciplinary collaborations so that basic research advances can be translated rapidly to clinical care for children with heart disease. Research focus ranges from the genetic basis of heart valve disease to clinical trials of novel surgical strategies for congenital heart disease repair and immune modulation in pediatric heart transplantation. Two of the centers will have Clinical Research Skills Development Cores to train fellows and junior faculty in clinical research methods.

Obligations

Fiscal Year 2008—$12,046,658

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-074728
2. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-074731
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-074732
4. Children's Hospital
   Boston, Massachusetts —HL-074734

Vascular Injury, Repair, and Remodeling

The purpose of this SCCOR is to foster multidisciplinary, clinically relevant research on vascular injury, repair, and remodeling. The program emphasizes development and translation of basic discoveries to understand the mechanisms of vascular disease; improved detection, characterization, staging, and management of vascular disease through use of cutting-edge methodologies, such as nanotechnology, molecular imaging, genomics, proteomics, and quantitative systems analysis; and development of new methods to treat vascular diseases such as cell- and gene-based therapies for regenerative medicine.

Obligations

Fiscal Year 2008—$14,426,483

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-083762
2. University of Texas Health
   Science Center
   Houston, Texas —HL-083794
3. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-083799
4. Stanford University
   Stanford, California —HL-083800
5. Boston University Medical Campus
   Boston, Massachusetts —HL-083801
6. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL-083813

Lung Diseases Program

Chronic Obstructive Pulmonary Disease

The purpose of this SCCOR is to foster multidisciplinary research to accelerate progress in the diagnosis, prevention, and treatment of COPD. The program will include a broad spectrum of basic and clinical research that will encompass animal models of COPD pathogenesis, human proteomic, genetic and genomic investigations, technologically refined disease phenotypes classification, and the development of new experimental therapeutic interventions.

Obligations

Fiscal Year 2008—$10,959,666

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-084922
2. Weill Medical College
   of Cornell University
   New York, New York —HL-084936
3. Johns Hopkins University
   Baltimore, Maryland —HL-084945
4. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-084948

Host Factors in Chronic Lung Diseases

The purpose of this SCCOR is to identify alterations in host responses and lung homeostasis and to determine how the dysregulation contributes to development or progression of chronic lung diseases. Enhanced understanding of these processes should facilitate identification of new targets for intervention, providing the basis for development of new therapeutic options for prevention and treatment of chronic lung diseases.

Obligations

Fiscal Year 2008—$8,057,527

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-084917
2. Children's Hospital
   Pittsburgh, Pennsylvania —HL-084932
3. University of North Carolina
   Chapel Hill, North Carolina —HL-084934

Pulmonary Vascular Disease

The objective of this SCCOR is to facilitate multidisciplinary research that proposes original hypotheses and applies cutting-edge approaches, including genomics and proteomics, to clinical issues in pulmonary vascular disease.

Obligations

Fiscal Year 2008—$6,352,758

Current Active Organizations and Grant Numbers

1. University of Colorado at Denver
   Denver, Colorado —HL-084923
2. Johns Hopkins University
   Baltimore, Maryland —HL-084946

Blood Diseases and Resources Program

Hemostatic and Thrombotic Disorders

The purpose of this SCCOR is to conduct multidisciplinary research to improve the prevention, diagnosis, and treatment of thrombotic and bleeding disorders. The program will support rapid translation of basic science findings into clinical application.

Obligations

Fiscal Year 2008—$8,076,374

Current Active Organizations and Grant Numbers

1. Vanderbilt University
   Nashville, Tennessee —HL-081009
2. Cleveland Clinic Lerner College
   Cleveland, Ohio —HL-081011
3. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-081012

Transfusion Biology and Medicine

The purpose of this SCCOR is to foster new approaches for improving the availability, efficacy, safety, and quality of blood and blood products for therapeutic uses. One of the centers has a large minority population.

Obligations

Fiscal Year 2008—$4,534,085

Current Active Organizations and Grant Numbers

1. Puget Sound Blood Center
   Seattle, Washington —HL-081015
2. University of California, San Francisco
   San Francisco, California —HL-081027

Centers of Excellence in Translational Human Stem Cell Research (P50) Program

The purpose of this program is to stimulate multidisciplinary collaboration among basic stem cell biologists, researchers, and clinicians with disease-specific expertise; physicians and surgeons skilled in innovative modes of cell delivery; and investigators experienced in developing and assessing animal models of human diseases to conduct projects such as preclinical studies for cell-based therapy employing human stem cells in animal models. Research findings will ultimately lead to innovative approaches for the prevention, treatment, and cure of disease, and will accelerate the translation of basic scientific discoveries into new therapies.

Obligations

Fiscal Year 2008—$1,382,673

Current Active Organization and Grant Number

1. University of California, Davis
   Davis, California —HL-085036

Basic and Translational Research Program (U54)

The NHLBI reconfigured the Comprehensive Sickle Cell Centers program into a Basic and Translational Research Program (BTRP). The Program emphasizes fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. The BTRP continues to support the Sickle Cell Disease Scholars program for the career development of young investigators and the Summer-for-Sickle Cell-Science program for research training and mentoring of high-school students. These components are part of a larger effort by NHLBI to prepare the next generation of scientists to advance the field of SCD research.

Obligation

Fiscal Year 2008—$13,586,635

Current Active Organizations and Grant Numbers

1. Thomas Jefferson University
   Philadelphia, Pennsylvania —HL-070585
2. RHO Federal Systems Division, Inc.
   Chapel Hill, North Carolina —HL-070587
3. University of Texas
   Southwestern Medical Center
   Dallas, Texas —HL-070588
4. St. Jude Children's Research Hospital
   Memphis, Tennessee —HL-070590
5. Boston Medical Center
   Boston, Massachusetts —HL-070819
6. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-070871
7. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-090503
8. Howard University
   Washington, DC —HL-090508
9. Children's Hospital
   Los Angeles, California —HL-090511
10. University of Chicago
    Chicago, Illinois —HL-090513
11. Johns Hopkins University
    Baltimore, Maryland —HL-090515
12. Virginia Commonwealth University
    Richmond, Virginia —HL-090516
13. University of Miami School of Medicine
    Miami, Florida —HL-090569

Specialized Centers for Cell-Based Therapies for Heart, Lung, and Blood Diseases (U54) Program

The Specialized Centers for Cell-Based Therapies Program, which includes a Data and Coordinating Center, was initiated in FY 2005 to support preclinical and clinical studies for cell-based therapy for heart, lung, and blood diseases and sleep disorders. A key feature of the program is the ability to conduct preclinical studies in the first year or two of the program, in order to meet the requirements for an Investigational New Drug application prior to initiating clinical studies. Clinical studies are expected to be initiated by the beginning of the third year.

Obligations

Fiscal Year 2008—$7,337,366

Current Active Organizations and Grant Numbers

1. Baylor College of Medicine
   Houston, Texas —HL-081007
2. EMMES Corporation
   Rockville, Maryland —HL-081021
3. Johns Hopkins University
   Baltimore, Maryland —HL-081028
4. Massachusetts General Hospital
   Boston, Massachusetts —HL-081030

Centers for AIDS Research (P30) Program

The NHLBI, along with five other NIH Institutes, contributes to the support of six Centers for AIDS Research that were established to provide a multidisciplinary environment that promotes basic, clinical, behavioral, and translational research activities in the prevention, detection, and treatment of HIV infection and AIDS. Almost half of the patient population comes from minority groups.

Obligations

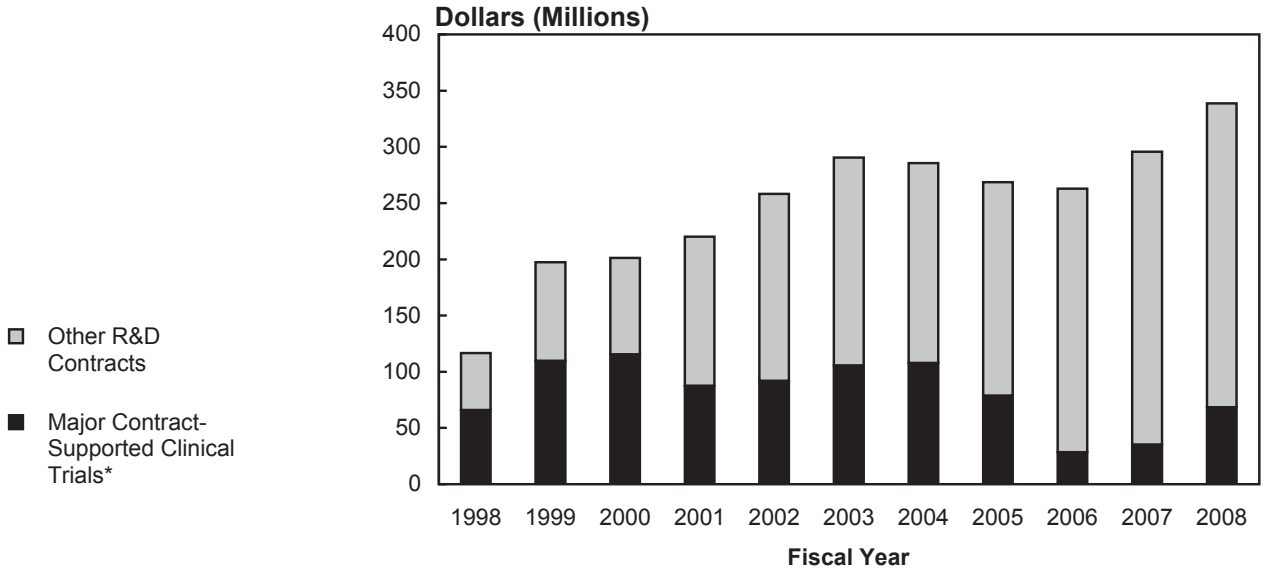
Fiscal Year 2008—$3,686,177

Current Active Organizations and Grant Numbers

1. New York University
   School of Medicine
   New York, New York —AI-027742
2. University of Washington
   Seattle, Washington —AI-027757
3. University of California, San Francisco
   San Francisco, California —AI-027763
4. University of Alabama at Birmingham
   Birmingham, Alabama —AI-027767
5. University of California, Los Angeles
   Los Angeles, California —AI-028697
6. Baylor University
   Houston, Texas —AI-036211
7. University of California, San Diego
   La Jolla, California —AI-036214
8. Case Western Reserve University
   Cleveland, Ohio —AI-036219
9. University of Massachusetts
   Medical School
   Worcester, Massachusetts —AI-042845
10. Miriam Hospital
    Providence, Rhode Island —AI-042853
11. University of Pennsylvania
    Philadelphia, Pennsylvania —AI-045008
12. Emory University
    Atlanta, Georgia —AI-050409
13. University of North Carolina
    at Chapel Hill
    Chapel Hill, North Carolina —AI-050410
14. Yeshiva University
    New York, New York —AI-051519
15. University of Colorado
    Health Sciences Center
    Denver, Colorado —AI-054907
16. Vanderbilt University
    Nashville, Tennessee —AI-054999
17. Harvard Medical School
    Boston, Massachusetts —AI-060354
18. Duke University
    Durham, North Carolina —AI-064518

10. Research and Development Contracts

NHLBI Research and Development Contract Obligations:* Fiscal Years 1998–2008



* For detailed data on contract-supported clinical trials, see Chapter 11.

NHLBI Total Research and Development Contract Obligations: Fiscal Years 1998–2008

Dollars (Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Heart	$ 77,886	$156,370	$156,415	$184,491	$214,971	$258,647	$245,881	$219,796	$213,320	$260,205	$296,445
Lung	13,123	25,432	23,341	10,993	16,578	11,745	14,131	20,946	25,902	15,191	20,249
Blood	25,695	15,436	21,538	24,572	26,751	20,082	25,460	27,831	23,629	20,446	22,093
Total	**$116,704[A]**	**$197,238[B]**	**$201,294[C]**	**$220,056[D]**	**$258,300[E]**	**$290,474[F]**	**$285,472[G]**	**$268,573[H]**	**$262,851[I]**	**$295,842[J]**	**$338,787[K]**

A Includes Program Evaluation and IMPAC II Assessments of $12,589,000.
B Includes Program Evaluation and IMPAC II Assessments of $14,904,000.
C Includes Program Evaluation and IMPAC II Assessments of $17,944,000.
D Includes Program Evaluation and IMPAC II Assessments of $24,579,000.
E Includes Program Evaluation and IMPAC II Assessments of $35,827,000.
F Includes Program Evaluation and IMPAC II Assessments of $54,550,000.
G Includes Program Evaluation and IMPAC II Assessments of $57,545,722.
H Includes Program Evaluation and IMPAC II Assessments of $64,399,000.
I Includes Program Evaluation and IMPAC II Assessments of $67,795,000.
J Includes Program Evaluation and IMPAC II Assessments of $68,405,000.
K Includes Program Evaluation and IMPAC II Assessments of $77,487,000.
Note: From 1999 to 2006 the WHI was reported separately. In this table, it has been incorporated in the "Heart" line.

Major NHLBI Research and Development Contracts by Program

	Total Obligations Prior to FY 2008	Total FY 2008 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Atherosclerosis Risk in Communities (ARIC)	$135,395,804	$ 7,005,220	$142,401,024
Candidate Gene Association Resources	16,261,517	1,959,413	18,220,930
Cardiovascular Health Study (CHS)	77,171,177	879,849	78,051,026
Coronary Artery Risk Development in Young Adults (CARDIA)	82,239,746	6,289,554	88,529,300
DNA Resequencing and Genotyping	24,000,000	1,352,366	25,352,366
Framingham Heart Study	75,999,817	23,134,059	99,133,876
Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GENTAC): National Registry	2,951,713	1,856,536	4,808,249
Hispanic Community Health Study (HCHS)	24,169,620	15,615,264	39,784,884
Jackson Heart Study (JHS)	28,102,322	4,694,251	32,796,573
Multi-Ethnic Study of Atherosclerosis (MESA)	68,667,692	7,850,725	76,518,417
NHLBI Gene Therapy Resource Program (GTRP)	5,900,000	5,900,000	11,800,000
Pediatric Circulatory Support	16,837,343	5,357,682	22,195,025
Proteomics Initiative	115,878,890	41,727,195	157,606,085
Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy	—	2,637,062	2,637,062
Registry for Mechanical Circulatory Support	3,747,718	1,314,180	5,061,898
Lung Diseases			
Lung Tissue Research Consortium	23,098,806	776,166	23,874,972
Tuberculosis Curriculum Coordinating Center	4,875,000	1,125,000	6,000,000
Blood Diseases and Resources			
Maintenance of NHLBI Biological Specimen Repository	9,807,153	3,560,582	13,367,735
Retrovirus Epidemiology Donor Study-II (REDS-II)	30,483,895	6,729,971	37,213,866
Sickle Cell Disease Health-Related Quality of Life Questionnaire	1,471,008	3,701,968	5,172,976
Somatic Cell Therapy Processing Facilities	21,732,735	18,191	21,750,926

Heart and Vascular Diseases Program

Atherosclerosis Risk in Communities (ARIC), Initiated in Fiscal Year 1985

The ARIC is a large, longitudinal study that aims to measure associations of CHD risk factors with atherosclerosis by race, gender, and geographic location. It focuses on early detection of CVD before symptoms, heart attacks, or strokes occur. The project consists of two groups: a community surveillance in four communities and a cohort component of 15,792 participants from the same communities. Three of the cohort components represent the racial mix of their community, whereas the fourth is exclusively black.

In 2006, the study began conducting a community surveillance of inpatients (ages ≥55 years) and outpatients (ages ≥65 years) who have heart failure. The study will continue through 2009 to determine the number of heart failure events occurring during the 2005–2009 period.

Obligations

Funding History:
Fiscal Year 2008—$7,005,220
Fiscal Years 1985–2007—$135,395,804
Total Funding to Date—$142,401,024

Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine
   Houston, Texas —HC-55016
3. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina —HC-55018
4. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HC-55019
5. Johns Hopkins University
   Baltimore, Maryland —HC-55020
6. Mississippi Medical Center
   Jackson, Mississippi —HC-55021

Candidate Gene Association Resources, Initiated in Fiscal Year 2006

This program establishes a genotyping and bioinformatics center to perform high-throughput genotyping for candidate gene association studies in up to 50,000 participants, and a genome-wide association study in about 500 disease cases and 1,000 controls. The data will be combined with available phenotype data to form a genotype–phenotype resource for public use. DNA for the 50,000-person sample will be collected from multiple NHLBI cohort studies that have stored samples and available data on a wide array of heart, lung, blood, and sleep phenotypes.

Obligations

Funding History:
Fiscal Year 2008—$1,959,413
Fiscal Years 2006–2007—$16,261,517
Total Funding to Date—$18,220,930

Current Active Organization and Contract Number

1. Massachusetts Institute of Technology
   Cambridge, Massachusetts —HC-65226

Cardiovascular Health Study (CHS), Initiated in Fiscal Year 1988

The CHS is a population-based, longitudinal study of risk factors for development and progression of CHS and stroke in elderly adults, 17 percent of whom are from minority populations. Extensive data and samples have been collected from nearly 6,000 participants since 1989–1990. The current CHS: Transition Phase provides partial support for an infrastructure to enable continued access to study resources and expertise, scientific collaborations, and mentorship of early-career investigators.

Obligations

Funding History:
Fiscal Year 2008—$879,849
Fiscal Years 1988–2007—$77,171,177
Total Funding to Date—$78,051,026

Current Active Organization and Contract Number

1. University of Washington
   Seattle, Washington —HC-85239

Coronary Artery Risk Development in Young Adults (CARDIA), Initiated in Fiscal Year 1984

CARDIA is a long-term study examining the evolution of CVD risk factors in a cohort of black and white adults, aged 18 to 30 years in 1985–1986. The study examines risk for heart and lung disease and diabetes by collecting information on body mass index, physical activity and lifestyle, genetics, serologic and metabolic components, inflammatory markers, and other subclinical markers of disease. Fifty percent of the participants are black.

Obligations

Funding History:
Fiscal Year 2008—$6,289,554
Fiscal Years 1984–2007—$82,239,746
Total Funding to Date—$88,529,300

Current Active Organizations and Contract Numbers

1. New England Medical Center Hospitals, Inc.
   Boston, Massachusetts —HC-45204
2. Wake Forest University Health Sciences
   Winston-Salem, North Carolina —HC-45205
3. University of Alabama at Birmingham
   Birmingham, Alabama —HC-48047
4. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HC-48048
5. Northwestern University
   Chicago, Illinois —HC-48049
6. Kaiser Permanente Division of Research
   Oakland, California —HC-48050
7. University of Alabama at Birmingham
   Birmingham, Alabama —HC-95095

DNA Resequencing and Genotyping, Initiated in Fiscal Year 2004

The purpose of this program is to obtain rapid, reliable, and cost-efficient DNA sequencing and genotyping of candidate genomic regions potentially important in the disease pathways of heart, lung, and blood diseases and sleep disorders. This information will assist ongoing investigations of genetic components involved in the causes, variable outcome, and progression of the diseases and disorders.

Obligations

Funding History:
Fiscal Year 2008—$1,352,366
Fiscal Years 2004–2007—$24,000,000
Total Funding to Date—$25,352,366

Current Active Organizations and Contract Numbers

1. University of Washington
   Seattle, Washington —HV-48194
2. Johns Hopkins University
   Baltimore, Maryland —HV-48195
3. J. Craig Venter Institute, Inc.
   Rockville, Maryland —HV-48196

Framingham Heart Study

The original Framingham Heart Study was designed as a longitudinal investigation of constitutional and environmental factors influencing the development of CVD in individuals free of these conditions at the outset. Of the original 5,209 subjects, about 500 members remain alive. In 1971, the Framingham Offspring Study was initiated to assess familial and genetic factors associated with CHD. More than 5,000 offspring (and their spouses) were included. A third-generation cohort consisting of approximately 4,000 grandchildren has been added to permit examination of numerous hypotheses about the genetic contribution to CVD and CVD risk factors. Additional goals include identifying new risk factors for cardiovascular, lung, and blood diseases and developing new imaging tests that can detect very early stages of coronary atherosclerosis in otherwise healthy adults.

Obligations

Funding History:
Fiscal Year 2008—$23,134,059
Fiscal Years 1983–2007—$75,999,817
Total Funding to Date—$99,133,876

Current Active Organization and Contract Number

1. Boston University Medical Center
   Boston, Massachusetts —HC-25195

Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GENTAC): National Registry, Initiated in Fiscal Year 2006

The purpose of this program is to establish a national registry to enable investigators to determine the best medical practices to advance the clinical management of genetic thoracic aortic aneurysms and other cardiovascular complications associated with connective tissue diseases such as Marfan Syndrome.

Obligations

Funding History:
Fiscal Year 2008—$1,856,536
Fiscal Years 2006–2007—$2,951,713
Total Funding to Date—$4,808,249

Current Active Organization and Contract Number

1. Research Triangle Institute
   Research Triangle Park, North Carolina —HV-68199

Hispanic Community Health Study (HCHS), Initiated in Fiscal Year 2006

The purpose of this program is to determine the prevalence of and risk factors for cardiovascular and lung diseases in Hispanic populations and the role of cultural adaptation and disparities in development of the diseases. The program is supporting a multicenter, 6.5-year epidemiology study comprising approximately 16,000 participants (Mexican Americans, Puerto Ricans, Cuban Americans, and Central/South Americans, 4,000 at each of 4 sites), aged 18 to 74 years.

Obligations

Funding History:
Fiscal Year 2008—$15,615,264
Fiscal Years 2006–2007—$24,169,620
Total Funding to Date—$39,784,884

Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina —HC-65233
2. University of Miami
   Miami, Florida —HC-65234

3. Albert Einstein College of Medicine
New York, New York —HC-65235
4. Northwestern University
Chicago, Illinois —HC-65236
5. San Diego State University
San Diego, California —HC-65237

Jackson Heart Study (JHS), Initiated in Fiscal Year 1998

The JHS is a single-site, epidemiologic study of CVD in blacks, similar to established studies in Framingham, Massachusetts, and Honolulu, Hawaii, with primary goals of identifying risk factors for development and progression of CVD; enhancing retention; building research capabilities at minority institutions; developing partnerships between minority and majority institutions; and expanding minority investigator participation in large-scale, epidemiologic studies.

Obligations

Funding History:
Fiscal Year 2008—$4,694,251
Fiscal Years 1998–2007—$28,102,322
Total Funding to Date—$32,796,573

Current Active Organizations and Contract Numbers

1. Jackson State University
Jackson, Mississippi —HC-95170
2. Mississippi Medical Center
Jackson, Mississippi —HC-95171
3. Tougaloo College
Tougaloo, Mississippi —HC-95172

Multi-Ethnic Study of Atherosclerosis (MESA), Initiated in Fiscal Year 1999

The purpose of this study is to investigate the prevalence, correlates, and progression of subclinical CVD, i.e., disease detected noninvasively before it has produced clinical signs and symptoms, in a population that is 38 percent white, 28 percent black, 22 percent Hispanic, and 12 percent Asian. In 2007, the fourth cohort exam was completed and plans are underway for a fifth exam beginning in 2010 to continue periodic monitoring of participants to identify recent hospitalizations and other clinical events. Researchers seek to increase understanding of the basis for racial/ethnic difference in CVD.

Obligations

Funding History:
Fiscal Year 2008—$7,850,725
Fiscal Years 1999–2007—$68,667,692
Total Funding to Date—$76,518,417

Current Active Organizations and Contract Numbers

1. University of Washington
Seattle, Washington —HC-95159
2. University of California, Los Angeles
Los Angeles, California —HC-95160
3. Columbia University
New York, New York —HC-95161
4. Johns Hopkins University
Baltimore, Maryland —HC-95162
5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-95163
6. Northwestern University
Chicago, Illinois —HC-95164
7. Wake Forest University
Winston-Salem, North Carolina —HC-95165
8. University of Vermont
Colchester, Vermont —HC-95166
9. New England Medical Center
Boston, Massachusetts —HC-95167
10. Johns Hopkins University
Baltimore, Maryland —HC-95168
11. Harbor-UCLA Research and Education Institute
Los Angeles, California —HC-95169

NHLBI Gene Therapy Resource Program (GTRP), Initiated in Fiscal Year 2007

The purpose of this program is to promote the translation of basic research into clinical trials. The program will support the production of safe and well-characterized vectors; conduct extensive toxicology and pharmacology studies on animals to determine vector dosing, related toxicity, and vector dissemination; and provide investigators with regulatory assistance to initiate a clinical trial. The GTRP also will support a maximum of two phase I/II gene transfer clinical trials per year that have successfully met all regulatory requirements and are ready to enroll patients within 12 months of application approval.

Obligations

Funding History:
Fiscal Year 2008—$5,900,000
Fiscal Year 2007—$5,900,000
Total Funding to Date—$11,800,000

Current Active Organizations and Contract Numbers

1. Social and Scientific Systems, Inc.
   Silver Spring, Maryland —HV-78200
2. Lovelace Biomedical Research & Education Institute
   Albuquerque, New Mexico —HV-78201
3. University of Pennsylvania
   Philadelphia, Pennsylvania —HV-78202
4. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HV-78203
5. Indiana University
   Indianapolis, Indiana —HV-78204

Pediatric Circulatory Support, Initiated in Fiscal Year 2004

The purpose of this program is to establish multidisciplinary teams to develop innovative circulatory assist devices or other bioengineered systems for infants and children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

Obligations

Funding History:
Fiscal Year 2008—$5,357,682
Fiscal Years 2004–2007—$16,837,343
Total Funding to Date—$22,195,025

Current Active Organizations and Contract Numbers

1. Cleveland Clinic
   Lerner College of Medicine
   Cleveland, Ohio —HV-48188
2. Ension, Inc.
   Pittsburgh, Pennsylvania —HV-48189
3. Jarvik Heart, Inc.
   New York, New York —HV-48190
4. Pennsylvania State University
   Hershey, Pennsylvania —HV-48191
5. University of Pittsburgh
   Pittsburgh, Pennsylvania —HV-48192

Proteomics Initiative, Initiated in Fiscal Year 2002

The purpose of this program is to establish highly interactive, multidisciplinary centers to enhance and develop innovative proteomic technologies directed to relevant biologic questions associated with heart, lung, blood, and sleep health and disease. Scientists will focus on the cells' protein machinery directed toward understanding the molecular basis of the causes and progression of heart, lung, and blood diseases and sleep disorders and identifying targets for therapeutic interventions.

Obligations

Funding History:
Fiscal Year 2008—$41,727,195
Fiscal Years 2002–2007—$115,878,890
Total Funding to Date—$157,606,085

Current Active Organizations and Contract Numbers

1. Boston University
   Boston, Massachusetts —HV-28178
2. Institute for Systems Biology
   Seattle, Washington —HV-28179
3. Johns Hopkins University
   Baltimore, Maryland —HV-28180
4. Medical University of South Carolina
   Charleston, South Carolina —HV-28181
5. Medical College of Wisconsin
   Milwaukee, Wisconsin —HV-28182
6. Stanford University
   Stanford, California —HV-28183
7. University of Texas
   Galveston, Texas —HV-28184
8. University of Texas
   Southwestern Medical Center
   Dallas, Texas —HV-28185
9. Yale University
   New Haven, Connecticut —HV-28186
10. Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.
    Rockville, Maryland —HV-28187

Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy, Initiated in Fiscal Year 2008

The purpose of this multicenter, double-blind, randomized trial is to compare three approaches to guiding warfarin therapy initiation: one based on an algorithm using clinical information and the individual's genotype relative to two genes known to influence warfarin metabolism (CYP2C9 and VKORC1 genes); one based on an algorithm using only clinical information; and one based on a standard, guideline-based initiation strategy. The trial will randomize approximately 2,000 participants with any indication for chronic long-term anticoagulation and no previous treatment with warfarin.

Obligations:

Funding History:
Fiscal Year 2008—$2,637,062
Total Funding to Date—$2,637,062

Current Active Organization and Contract Number

1. University of Pennsylvania
Philadelphia, Pennsylvania —HV-88210

Registry for Mechanical Circulatory Support, Initiated in Fiscal Year 2005

The purpose of this program is to establish a data and clinical coordinating center to manage a registry of patients receiving a mechanical circulatory support device (MCSD) to treat heart failure. The registry will collect and analyze clinical and laboratory data and tissue samples from patients who receive MCSDs as destination therapy for end-stage heart failure at 60 to 70 participating hospitals.

Obligations

Funding History:
Fiscal Year 2008—$1,314,180
Fiscal Years 2005–2007—$3,747,718
Total Funding to Date—$5,061,898

Current Active Organization and Contract Number

1. University of Alabama
Birmingham, Alabama —HV-58198

Lung Diseases Program

Lung Tissue Research Consortium, Initiated in Fiscal Year 2004

The purpose of this program is to establish a consortium for collecting lung tissues and preparing and distributing them for research. Scientists seek to improve management of lung diseases by increasing understanding of the pathogenetic mechanisms of lung diseases through molecular histopathological studies on tissues with and without disease. Primary emphases are on COPD and idiopathic pulmonary fibrosis.

Obligations

Funding History:
Fiscal Year 2008—$776,166
Fiscal Years 2004–2007—$23,098,806
Total Funding to Date—$23,874,972

Current Active Organizations and Contract Numbers

1. Mayo Clinic College of Medicine
Rochester, New York —HR-46158
2. University of Colorado
Health Science Center
Denver, Colorado —HR-46159
3. University of Michigan
Ann Arbor, Michigan —HR-46162

Tuberculosis Curriculum Coordinating Center, Initiated in Fiscal Year 2003

The purpose of this program is to establish a consortium of five Tuberculosis Curriculum Centers to strengthen and increase access to the best ongoing educational and training opportunities in TB for medical, nursing, and allied health schools, especially those that provide primary care to communities where TB is endemic and the population is at high risk.

Obligations

Funding History:
Fiscal Year 2008—$1,125,000
Fiscal Years 2003–2007—$4,875,000
Total Funding to Date—$6,000,000

Current Active Organization and Contract Number

1. University of California, San Diego
La Jolla, California —HR-36157

Blood Diseases and Resources Program

Maintenance of NHLBI Biological Specimen Repository, Initiated in Fiscal Year 1998

The purpose of this project is to establish an NHLBI Biological Specimen Repository for blood specimens from Institute-supported research. The Repository monitors storage, labeling, and testing of the specimens, as well as administers safe shipment of precise sample aliquots to approved investigators for future studies.

Obligations

Funding History:
Fiscal Year 2008—$3,560,582
Fiscal Years 1998–2007—$9,807,153
Total Funding to Date—$13,367,735

Current Active Organization and Contract Number

1. SeraCare Life Sciences, Inc.
Rockville, Maryland —HB-87144

Retrovirus Epidemiology Donor Study-II (REDS-II), Initiated in Fiscal Year 2005

The purpose of the program is to conduct epidemiologic, laboratory, and survey research on volunteer blood donors within the United States to ensure the safety and availability of the blood supply. The study seeks to assess the prevalence and incidence of existing as well as newly discovered infectious agents that pose a threat to blood safety; evaluate characteristics and behaviors of voluntary blood donors; determine the causes of adverse transfusion reactions of unknown etiology; assess new and existing blood donor screening methodologies; assess the impact of new blood bank technologies on blood safety and availability; and evaluate the donation process for ways to improve the adequacy of the blood supply.

An international component was added to conduct epidemiologic, laboratory, and survey research on blood donors in China and Brazil, two countries seriously affected by the AIDS epidemic, to ensure the availability and safety of blood for transfusion.

Obligations

Funding History:
Fiscal Year 2008—$6,729,971
Fiscal Years 2005–2007—$30,483,895
Total Funding to Date—$37,213,866

Current Active Organizations and Contract Numbers

1. Blood Center of Southeastern Wisconsin
   Milwaukee, Wisconsin —HB-47168
2. American Red Cross Blood Service, New England
   Farmington, Connecticut —HB-47169
3. Emory University
   Atlanta, Georgia —HB-47170
4. University of Cincinnati
   Cincinnati, Ohio —HB-47171
5. Institute for Transfusion Medicine
   Pittsburgh, Pennsylvania —HB-47172
6. University of California, San Francisco
   San Francisco, California —HB-47174
7. Westat, Inc.
   Rockville, Maryland —HB-47175
8. Blood System Research, Inc.
   San Francisco, California —HB-57181

Sickle Cell Disease Health-Related Quality of Life Questionnaire, Initiated in Fiscal Year 2005

The purpose of this project is to develop a psychometrically sound and clinically useful health-related quality-of-life instrument and related materials for use in sickle cell clinical trials and outcomes research among adults with SCD, and to assist researchers who are early users of the instrument and materials.

Obligations

Funding History:
Fiscal Year 2008—$3,701,968
Fiscal Years 2005–2007—$1,471,008
Total Funding To Date—$5,172,976

Current Active Organization and Contract Number

1. American Institutes for Research
   Health Program
   Silver Spring, Maryland —HL-54264

Somatic Cell Therapy Processing Facilities, Initiated in Fiscal Year 2003

This program is designed to develop novel somatic cellular therapies in areas ranging from basic science through animal studies to proof-of-principle and eventually human trials for heart, lung, and blood diseases and sleep disorders. The goal is to provide rapid, safe translation of basic research ideas into clinical practice.

Obligations

Funding History:
Fiscal Year 2008—$18,191
Fiscal Years 2003–2007—$21,732,735
Total Funding to Date—$21,750,926

Current Active Organizations and Contract Numbers

1. Baylor College of Medicine
   Houston, Texas —HB-37163
2. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HB-37164
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HB-37165
4. The EMMES Corporation
   Rockville, Maryland —HB-37166

11. Clinical Trials

A clinical trial is defined as a scientific research study undertaken with human subjects to evaluate prospectively the diagnostic, prophylactic, or therapeutic effect of a drug, device, regimen, or procedure used or intended ultimately for use in the practice of medicine or the prevention of disease. A clinical trial is planned and conducted prospectively and includes a concurrent control group or other appropriate comparison group.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1998–2008

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Heart and Vascular Diseases											
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	$ 582	$ 584	$ 392	$ 75	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Women's Health Study (WHS)	1,536	1,530	1,594	—	—	—	—	889	—	868	875
Cardiovascular Risk Factors and the Menopause	528	186	—	—	—	—	—	—	—	—	—
Women's Antioxidant and Cardiovascular Study (WACS)	525	540	556	572	598	592	599	670	—	—	—
Stress Reduction and Atherosclerotic CVD in Blacks	40	326	339	360	376	394	—	—	—	—	—
Enalapril After Anthracycline Cardiotoxicity	789	—	—	—	—	—	—	—	—	—	—
Estrogen Replacement and Atherosclerosis (ERA) Trial*	1,668	1,017	—	—	—	—	—	—	—	—	—
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	874	—	440	362	298	291	296	—	—	—	—
HDL-Atherosclerosis Treatment Study	340	—	326	—	—	—	—	—	—	—	—
Women's Estrogen/Progestin Lipid Lowering Hormone Atherosclerosis Regression Trial (WELL-HART)*	1,269	1,131	—	32	—	—	—	—	—	—	—
Mode Selection Trial in Sinus Node Dysfunction (MOST)*	1,700	2,879	1,136	154	—	—	—	—	—	—	—
Postmenopausal Hormone Therapy in Unstable Angina	271	276	—	—	—	—	—	—	—	—	—
Estrogen and Graft Atherosclerosis Research Trial (EAGER)*	305	—	361	371	—	—	—	—	—	—	—
Soy Estrogen Alternative Study (SEA)	221	—	—	—	—	—	—	—	—	—	—
REMATCH Trial*	1,798	1,333	825	750	—	—	—	—	—	—	—
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)***	3,693	3,646	1,247	151	387	376	395	—	—	—	—
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*	1,667	1,709	1,698	1,798	1,412	1,930	—	—	—	—	—
CVD Risk and Health in Post-Menopausal Phytoestrogen Users	662	574	244	—	304	152	—	—	—	—	—
Treatment of Hypertension With Two Exercise Intensities	474	473	481	420	—	—	—	—	—	—	—

* Paid by U01/U10.
** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Heart and Vascular Diseases (continued)											
Prevention of Recurrent Venous Thromboembolism (PREVENT)	1,242	894	521	543	1,272	—	—	—	—	—	—
PREMIER: Lifestyle Interventions for Blood Pressure Control*	2,234	3,425	3,595	2,925	1,505	—	—	—	—	—	—
Azithromycin and Coronary Events Study (ACES)*	847	2,663	2,182	720	1,254	1,137	—	—	—	—	—
Antiarrhythmic Effects of N-3 Fatty Acids	—	514	542	529	647	—	—	—	—	—	—
Fatty Acid Antiarrhythmia Trial (FAAT)	—	519	605	—	—	—	—	—	—	—	—
Occluded Artery Trial (OAT)*	—	4,892	5,079	2,604	1,724	1,963	—	—	963	1,452	1,277
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	—	—	3,942	6,515	9,342	8,189	8,265	8,304	8,592	2,647	1,971
Hematocrit Strategy in Infant Heart Surgery*	—	—	473	557	596	590	492	—	—	—	—
Angiotensin-II Blockade in Mitral Regurgitation	—	—	—	553	610	629	500	—	—	—	—
Heart Failure Adherence and Retention Trial (HART)	—	—	—	795	1,617	1,453	1,174	862	740	304	—
Reduction of Triglycerides in Women on HRT	—	—	—	708	746	555	544	721	—	625	501
Women's Ischemia Syndrome Evaluation (WISE)* **	—	—	—	1,502	1,506	1,306	1,303	996	—	—	—
ACE Inhibition and Novel Cardiovascular Risk Factors	—	—	—	—	694	656	602	—	—	—	—
Heart Failure: A Controlled Trial Investigating Outcomes of Exercise (HF-ACTION)*	—	—	—	—	7,471	9,582	7,973	4,483	4,590	2,846	652
Clinical Trial of Dietary Protein on Blood Pressure	—	—	—	—	655	610	612	504	500	—	—
Home Automatic External Defibrillator Trial (HAT)*	—	—	—	—	3,567	5,433	4,264	1,801	2,115	—	—
Perioperative Interventional Neuroprotection Trial (POINT)	—	—	—	—	553	553	562	572	378	—	—
Stop Atherosclerosis in Native Diabetics Study (SANDS)*	—	—	—	—	2,410	2,165	2,107	2,324	2,074	197	218
Surgical Treatment for Ischemic Heart Failure (STICH)*	—	—	—	—	5,709	4,495	1,613	6,082	5,583	9,396	3,639
Girls Health Enrichment Multisite Studies (GEMS)*	—	—	—	—	—	2,461	2,400	2,369	1,950	—	—
Treatment of Depression Following Bypass Surgery	—	—	—	—	—	964	1,132	1,181	1,193	885	—
Weight Loss Maintenance (WLM)*	—	—	—	—	—	3,687	4,368	3,099	4,015	2,151	145
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	—	—	—	—	—	—	4,343	5,610	4,884	3,307	3,269

* Paid by U01/U10.
** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Heart and Vascular Diseases (continued)											
FREEDOM Trial: Future Revascularization Evaluation in Patients With Diabetes Mellitus: Optional Management of Multivessel Disease	—	—	—	—	—	—	3,663	4,669	—	5,180	2,818
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care*	—	—	—	—	—	—	5,170	9,514	10,966	—	—
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	—	—	—	—	—	—	—	663	6,324	6,018	1,380
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	—	—	—	—	—	—	—	1,368	1,478	1,898	—
Intervention To Control Obesity in College	—	—	—	—	—	—	—	—	677	633	670
PACEmaker and Beta-Blocker Therapy Post-Myocardial Infarction (PACE-MI)	—	—	—	—	—	—	—	—	1,300	4,555	384
Efficacy of Smoking Quit Line in the Military	—	—	—	—	—	—	—	—	—	739	720
Vest prevention of Early Sudden Death Trial (VEST) and PREDiction of ICd Therapies Studies (PREDICTS)*	—	—	—	—	—	—	—	—	—	1,390	1,356
Planned Care for Obesity and Risk Reduction (Planned CORR)	—	—	—	—	—	—	—	—	—	—	784
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation on the AIM-High Trial	—	—	—	—	—	—	—	—	—	—	302
Subtotal, Heart and Vascular Diseases	23,265	29,111	26,578	22,996	45,253	50,163	52,377	56,681	58,312	45,091	20,961
Lung Diseases											
Lung Health Study II* **	980	—	—	—	—	—	—	—	—	—	—
Lung Health Study III* **	1,997	1,986	1,616	1,672	927	—	—	—	—	—	—
Asthma Clinical Research Network (ACRN)* **	4,934	5,399	5,686	5,705	5,863	—	—	—	—	—	—
Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia*	—	419	429	181	—	—	—	—	—	—	—
Scleroderma Lung Study*	—	1,040	1,501	1,761	1,501	1,055	—	—	71	—	—
Inhaled Nitric Oxide for Prevention of Chronic Lung Disease*	—	—	1,959	1,803	1,764	1,442	1,245	—	—	—	—
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	—	—	1,548	1,742	1,839	1,604	903	—	—	—	—
Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II)*	—	—	2,190	3,667	3,388	472	—	—	—	—	—
Randomized Trial To Reduce ETS in Children With Asthma	—	—	555	545	468	277	—	—	—	—	—
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*	—	—	—	—	3,224	3,021	3,110	3,188	—	1,532	—
Childhood Asthma Management Program-Continuation Study (CAMP-CS)/Phase II* **	—	—	—	—	—	1,489	2,043	2,623	2,750	—	—
Clinical Trial of Acid Reflux Therapy in Asthma*	—	—	—	—	—	736	783	791	773	662	—

* Paid by U01/U10.
** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Lung Diseases (continued)											
Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP)	—	—	—	—	—	682	612	608	694	—	—
Outcomes of Sleep Disorders in Older Men	—	—	—	—	—	4,163	4,262	1,390	1,142	910	—
Supplemental Selenium and Vitamin E and Pulmonary Function	—	—	—	—	—	698	610	630	605	561	—
Improving Asthma Care in Minority Children in Head Start	—	—	—	—	—	—	721	826	1,004	779	—
Randomized Control Study of Adenotonsillectomy for Childhood Sleep Apnea	—	—	—	—	—	—	—	—	2,255	2,388	1,346
Early Insulin Therapy and Development of ARDS	—	—	—	—	—	—	—	—	—	489	454
Childhood Asthma Management Program—Continuation Study (CAMP-CS)/Phase III[*] [**]	—	—	—	—	—	—	—	—	—	2,077	1,966
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)[*]	—	—	—	—	—	—	—	—	—	—	732
Scleroderma Lung Study II	—	—	—	—	—	—	—	—	—	—	2,281
Sedation Management in Pediatric Patients With Acute Respiratory Failure[*]	—	—	—	—	—	—	—	—	—	—	568
Subtotal, Lung Diseases	7,911	8,844	15,484	17,076	18,974	15,639	14,289	10,056	9,294	9,398	7,347
Blood Diseases and Resources											
Stroke Prevention in Sickle Cell Anemia (STOP)[*]	2,036	—	293	—	—	—	—	—	—	—	—
Stroke Prevention in Sickle Cell Anemia (STOP 2)[*]	—	—	4,200	3,166	3,168	2,320	2,366	—	—	—	—
Induction of Stable Chimerism for Sickle Cell Anemia	—	—	—	489	525	527	551	—	—	—	—
Sibling Donor Cord Blood Banking and Transplantation	—	—	—	1,222	1,224	1,286	1,353	—	—	—	—
FOCUS	—	—	—	—	—	1,639	1,796	2,923	2,446	1,974	—
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)[*]	—	—	—	—	—	—	—	3,345	3,932	3,531	3,828
Randomized Trial of Interventions To Improve Warfarin Adherence	—	—	—	—	—	—	—	—	—	—	801
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE)[*]	—	—	—	—	—	—	—	—	—	—	4,632
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial	—	—	—	—	—	—	—	—	—	—	2,071
Subtotal, Blood Diseases and Resources	2,036	—	4,493	4,877	4,917	5,772	6,066	6,268	6,378	5,505	11,332
Total, NHLBI	**$33,212**	**$37,955**	**$46,555**	**$44,949**	**$69,144**	**$71,574**	**$72,732**	**$73,005**	**$73,984**	**$59,994**	**$39,640**

[*] Paid by U01/U10.
[**] Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2008: Summary by Program

	Total Obligations Prior to FY 2008	FY 2008 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
AIM HIGH: Niacin Plus Statin to Prevent Vascular Events*	$ 13,005,383	$ 1,380,228	$ 14,385,611
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetes (BARI 2D)*	55,796,975	1,970,667	57,767,642
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	18,144,173	3,269,101	21,413,274
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation in the AIM-HIGH Trial	—	301,776	301,776
Efficacy of Smoking Quit Line in the Military	738,869	719,504	1,458,373
FREEDOM Trial: Future Revascularization Evaluation in Patients With Diabetes Mellitus: Optimal Management of Multivessel Disease	13,512,766	2,817,871	16,330,637
Heart Failure: A Controlled Trial Investigating Outcomes of Exercise Training (HF-ACTION)*	36,945,998	652,481	37,598,479
Intervention to Control Obesity in College	1,300,228	670,326	1,970,554
Occluded Artery Trial (OAT)	18,676,892	1,276,603	19,953,495
PACEmaker and Beta-Blocker Therapy Post-Myocardial Infarction (PACE-MI)*	5,854,590	383,500	6,238,090
Planned Care for Obesity and Risk Reduction (Planned CORR)	—	784,317	784,317
Reduction of Triglycerides in Women on HRT	3,900,110	500,999	4,401,109
Stop Atherosclerosis in Native Diabetics Study (SANDS)*	11,276,341	217,811	11,494,152
Surgical Treatment for Ischemic Heart Failure (STICH)*	32,878,158	3,638,832	36,516,990
Vest Prevention of Early Sudden Death Trial (VEST) and PREDiction of ICd Therapies Studies (PREDICTS)*	1,389,760	1,356,317	2,746,077
Weight Loss Maintenance (WLM)*	17,318,900	145,082	17,463,982
Women's Health Study (WHS)	17,790,540	875,149	18,665,689
Subtotal, Heart and Vascular Diseases	248,529,683	20,960,564	269,490,247
Lung Diseases			
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea*	4,642,131	1,345,909	5,988,040
Childhood Asthma Management Program III (CAMP III)*	2,077,278	1,965,954	4,043,232
Early Insulin Therapy and Development of ARDS	489,176	454,040	943,216
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)*	—	732,476	732,476
Scleroderma Lung Study II	—	2,280,616	2,280,616
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	—	567,715	567,715
Subtotal, Lung Diseases	7,208,585	7,346,710	14,555,295
Blood Diseases and Resources			
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT–ATTRACT Trial*	—	2,070,898	2,070,898
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial	—	4,632,060	4,632,060
Interventions To Improve Warfarin Adherence	—	800,516	800,516
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)*	10,808,766	3,828,227	14,636,993
Subtotal, Blood Diseases and Resources	10,808,766	11,331,701	22,140,467
Total, NHLBI	**$266,547,034**	**$39,638,975**	**$306,186,009**

* Paid by U01/U10.

Institute-Initiated Clinical Trials: Fiscal Years 1998–2008

Contracts

	Dollars (Thousands)										
	Fiscal Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Heart and Vascular Diseases											
Lipid Research Clinics	$ 685	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Antiarrhythmic vs. Implantable Defibrillator (AVID)	871	548	—	—	—	—	—	—	—	—	—
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	17,119	—	6,259	7,000	3,980	2,761	3,346	—	—	—	—
Activity Counseling Trial (ACT)	2,439	—	—	—	—	—	—	—	—	—	—
Postmenopausal Estrogen/Progestin Interventions (PEPI)	170	—	—	—	—	—	—	—	—	—	—
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD)	5,904	3,303	3,487	596	425	70	—	—	—	—	—
Atrial Fibrillation Follow-Up: Investigation in Rhythm Management (AFFIRM)	—	3,785	1,239	2,401	802	—	—	—	—	—	—
Beta-Blocker Evaluation Survival Trial (BEST)	2,448	—	—	—	—	—	—	—	—	—	—
Women's Angiographic Vitamin and Estrogen Trial (WAVE)	1,917	3,878	886	756	—	32	—	—	—	—	—
Women's Ischemia Syndrome Evaluation (WISE)	2,932	856	1,424	10	50	—	—	—	—	—	—
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	2,836	2,850	5,988	—	2,849	558	—	—	—	—	—
Magnesium in Coronaries (MAGIC)	1,169	2,009	1,243	—	238	—	—	—	—	—	—
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	—	1,750	1,820	—	1,129	—	—	—	311	—	—
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	—	4,130	6,590	—	1,750	18,521	33,779	26,126	—	19,484	16,343
Women's Health Initiative	—	59,100	57,700	59,200	59,010	63,222	57,483	37,826	12,124	14,873	22,609
Public Access Defibrillation (PAD) Community Trial	—	2,923	2,414	3,058	1,101	—	—	—	—	—	—
Trial of Aldosterone Antagonist Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	—	—	—	—	—	—	837	5,162	5,480	2,218	7,912
Subtotal, Heart and Vascular Diseases	38,490	85,132	89,050	73,021	71,334	85,164	95,445	69,114	17,915	36,575	46,864
Lung Diseases											
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	1,979	—	315	—	113	—	—	—	—	—	—
Childhood Asthma Management Program (CAMP)	—	6,551	729	1,330	2,786	2,287	1,475	599	—	—	—
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	4,880	6,837	5,587	2,667	1,502	4,402	5,517	4,707	7,396	5,037	1,992

Institute-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Contracts (continued)

	Dollars (Thousands)										
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Lung Diseases (continued)											
National Emphysema Treatment Trial (NETT)	3,367	7,545	4,047	6,989	7,910	1,630	1,648	357	—	—	—
Feasibility of Retinoid Treatment in Emphysema (FORTE)	—	884	7,711	—	2,429	725	507	185	—	—	—
Long-Term Oxygen Treatment Trial (LOTT)	—	—	—	—	—	—	—	—	—	6,208	10,042
Subtotal, Lung Diseases	10,226	21,817	18,389	10,986	14,740	9,044	9,147	5,848	7,396	11,245	12,034
Blood Diseases and Resources											
Clinical Course of Sickle Cell Disease	2,144	350	106	—	—	—	—	—	—	—	—
T-Cell Depletion in Unrelated Donor Marrow Transplantation	2,228	690	1,085	1,144	557	774	164	—	—	—	—
Viral Activation Transfusion Study (VATS)	1,668	—	339	—	—	—	—	—	—	—	—
Cord Blood Stem Cell Transplantation Study (COBLT)	12,530	1,456	5,122	1,846	2,166	588	707	822	—	—	—
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-Up	475	469	—	—	588	994	1,136	1,340	—	—	—
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	—	—	1,606	405	3,100	1,112	1,964	1,526	891	3,966	5,573
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	—	—	—	—	—	—	—	—	1,867	2,801	3,702
Subtotal, Blood Diseases and Resources	19,045	2,965	8,258	3,395	6,411	3,468	3,971	3,688	2,758	6,767	9,275
Total, NHLBI Clinical Trials Contracts	**$67,761**	**$109,914**	**$115,697**	**$87,402**	**$92,485**	**$97,676**	**$108,563**	**$78,650**	**$28,069**	**$54,587**	**$68,173**

Institute-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Cooperative Agreements

	Dollars (Thousands)										
	Fiscal Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Heart and Vascular Diseases											
Bypass Angioplasty Revascularization Investigation (BARI)	$ 1,360	$ 1,609	$ 1,634	$ 1,549	$ 1,456	$ —	$ —	$ —	$ —	$ —	$ —
Child and Adolescent Trial for Cardiovascular Health (CATCH)	572	210	—	—	—	—	—	—	—	—	—
Obesity Prevention in Young American Indians (PATHWAYS)	3,945	4,196	2,459	—	—	—	—	—	—	—	—
Rapid Early Action for Coronary Treatment (REACT)	496	—	—	—	—	—	—	—	—	—	—
Girls Health Enrichment Multisite Studies (GEMS)	—	2,282	2,365	2,877	2,713	—	—	—	—	—	—
Trial of Activity for Adolescent Girls (TAAG)	—	—	5,274	4,831	5,919	5,828	6,350	5,103	905	—	—
Pediatric Heart Network	—	—	—	3,447	4,822	5,381	4,948	3,992	6,988	6,607	12,255
Clinical Research Consortium To Improve Resuscitation Outcome	—	—	—	—	—	—	6,886	9,339	9,728	8,972	5,279
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes	—	—	—	—	—	—	1,010	—	—	—	—
Clinical Trials in Organ Transplantation (CTOT)	—	—	—	—	—	—	—	1,900	1,855	1,801	1,635
Heart Failure Clinical Research Network	—	—	—	—	—	—	—	—	5,642	7,801	7,813
Practice-Based Opportunity for Weight Reduction (POWER) Trials*	—	—	—	—	—	—	—	—	2,567	3,714	3,656
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	—	—	—	—	—	—	—	—	1,419	2,314	3,151
Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center	—	—	—	—	—	—	—	—	1,000	500	490

* Formerly known as Weight-Loss in Obese Adults With Cardiovascular Risk Factors.

Institute-Initiated Clinical Trials: Fiscal Years 1998–2008 (continued)

Cooperative Agreements (continued)

	Dollars (Thousands)										
	Fiscal Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Heart and Vascular Diseases (continued)											
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	—	—	—	—	—	—	—	—	—	6,009	8,681
Cardiovascular Cell Therapy Research Network)	—	—	—	—	—	—	—	—	—	4,424	7,568
Subtotal, Heart and Vascular Diseases	6,373	8,297	11,732	12,704	14,910	11,209	19,194	20,334	30,104	42,142	50,528
Lung Diseases											
Asthma Clinical Research Network (ACRN)*	—	—	—	—	—	8,181	8,424	8,667	7,839	8,918	872
Childhood Asthma Research and Education (CARE) Network	—	4,175	5,002	5,314	6,005	5,610	5,292	5,704	5,735	5,916	4,887
COPD Clinical Research Network	—	—	—	—	—	6,843	6,848	8,438	7,664	6,836	3,400
Idiopathic Pulmonary Fibrosis Clinical Research Network	—	—	—	—	—	—	—	3,486	7,349	7,216	7,154
NICHD Cooperative Multicenter Neonatal Research Network	—	—	—	—	—	—	—	—	1,336	238	27
Subtotal, Lung Diseases	—	4,175	5,002	5,314	6,005	20,634	20,564	26,295	29,923	29,124	16,340
Blood Diseases and Resources											
Thalassemia (Cooley's Anemia) Clinical Research Network	—	—	2,192	2,219	2,269	2,320	2,375	2,730	2,682	2,618	2,600
Blood and Marrow Transplant Clinical Research Network	—	—	—	5,360	5,899	5,950	5,972	6,460	6,845	6,709	6,952
Transfusion Medicine/ Hemostasis Clinical Research Network	—	—	—	—	6,053	6,241	6,093	6,221	6,521	6,407	6,374
Sickle Cell Disease Clinical Research Network	—	—	—	—	—	—	—	—	3,761	7,498	7,173
Subtotal, Blood Diseases and Resources	—	—	2,192	7,579	14,221	14,511	14,440	15,411	19,809	23,232	23,099
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	**$6,373**	**$12,472**	**$18,926**	**$25,597**	**$35,136**	**$46,354**	**$54,198**	**$62,040**	**$79,836**	**$94,498**	**$89,967**
Total, NHLBI-Initiated Clinical Trials	**$74,134**	**$122,386**	**$134,623**	**$112,999**	**$127,621**	**$144,030**	**$162,761**	**$140,690**	**$107,905**	**$149,085**	**$158,140**

* Investigator-Initiated from 1998 to 2002.

Institute-Initiated Clinical Trials, Fiscal Year 2008: Summary by Program

Contracts

	Total Obligations Prior to FY 2008	Total FY 2008 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Action to Control Cardiovascular Risk in Diabetes (ACCORD)	$110,379,858	$16,343,623	$ 126,723,481
Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	13,696,387	7,912,414	21,608,801
Women's Health Initiative	737,438,335	22,608,710	760,047,045
Subtotal, Heart and Vascular Diseases	861,514,580	46,864,747	908,379,327
Lung Diseases			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	63,348,358	1,991,538	65,339,896
Long-Term Oxygen Treatment Trial (LOTT)	6,208,395	10,041,750	16,250,145
Subtotal, Lung Diseases	69,556,753	12,033,288	81,590,041
Blood Diseases and Resources			
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	14,570,399	5,573,216	20,143,615
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	4,668,174	3,701,968	8,370,142
Subtotal, Blood Diseases and Resources	19,238,573	9,275,184	28,513,757
Total, NHLBI-Initiated Clinical Trials, Contracts	**$950,309,906**	**$68,173,219**	**$1,018,483,125**

Note: From 1999 to 2006, the WHI was reported separately under its own major heading. In this table, it is included in the Heart and Vascular Diseases section.

Cooperative Agreements

	Total Obligations Prior to FY 2008	Total FY 2008 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Cardiovascular Cell Therapy Research Network	$ 4,424,183	$ 7,568,262	$ 11,992,445
Clinical Research Consortium To Improve Resuscitation Outcome	34,924,311	5,279,451	40,203,762
Clinical Trials in Organ Transplantation (CTOT)	5,556,895	1,635,346	7,192,241
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	3,732,749	3,150,539	6,883,288
Heart Failure Clinical Research Network	13,443,043	7,813,234	21,256,277
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	6,008,848	8,681,013	14,689,861
Pediatric Heart Network	36,186,196	12,254,539	48,440,735
Pediatric HIV/AIDS Cohort Study—Data and Operations Center	1,500,000	490,000	1,990,000
Practice-Based Opportunity for Weight Reduction (POWER) Trials*	6,281,092	3,656,172	9,937,264
Subtotal, Heart and Vascular Diseases	112,057,317	50,528,556	162,585,873
Lung Diseases			
Asthma Clinical Research Network (ACRN), Phase II	42,028,773	872,328	42,901,101
Childhood Asthma Research and Education (CARE) Network	48,753,133	4,887,330	53,640,463
COPD Clinical Research Network	36,630,386	3,400,000	40,030,386
Idiopathic Pulmonary Fibrosis Clinical Research Network	18,051,677	7,154,215	25,205,892
NICHD Cooperative Multicenter Neonatal Research Network	1,573,806	27,440	1,601,246
Subtotal, Lung Diseases	147,037,775	16,341,313	163,379,088
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	43,195,601	6,951,519	50,147,120
Sickle Cell Disease Clinical Research Network	11,259,232	7,172,797	18,432,029
Thalassemia (Cooley's Anemia) Clinical Research Network	19,405,539	2,600,482	22,006,021
Transfusion Medicine/Hemostasis Clinical Research Network	37,535,254	6,373,860	43,909,114
Subtotal, Blood Diseases and Resources	111,395,626	23,098,658	134,494,284
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	**$370,490,718**	**$89,968,527**	**$460,459,245**
Total, NHLBI-Initiated Clinical Trials	**$1,320,800,624**	**$158,141,746**	**$1,478,942,370**

* Formerly known as Weight-Loss in Obese Adults With Cardiovascular Risk Factors.

Heart and Vascular Diseases Program

Action To Control Cardiovascular Risk in Diabetes (ACCORD), Initiated in Fiscal Year 1999

The purpose of this study is to evaluate three diabetic treatment strategies (intensive glycemic control, blood pressure control, and fibrate treatment to raise HDL-cholesterol and lower triglycerides) to prevent major cardiovascular events in patients with type 2 diabetes mellitus. The primary outcome measure is CVD mortality or major morbidity (MI and stroke). A vanguard phase of about 1,000 participants was completed in FY 2002, and the main trial proceeded in FY 2003.

Obligations

Funding History:
Fiscal Year 2008—$16,343,623
Fiscal Years 1999–2007—$110,379,858
Total Funding to Date—$126,723,481

Current Active Organizations and Contract Numbers

1. Veterans Affairs Medical Center, Albuquerque
   Albuquerque, New Mexico —HC-10100
2. Veterans Affairs Medical Center, Memphis
   Memphis, Tennessee —HC-90350
3. Wake Forest University
   Winston-Salem, North Carolina —HC-95178
4. McMaster University
   Hamilton, Ontario —HC-95179
5. University of Washington
   Seattle, Washington —HC-95180
6. Case Western Reserve University
   Cleveland, Ohio —HC-95181
7. Wake Forest University
   Winston-Salem, North Carolina —HC-95182
8. Minneapolis Medical Research Foundation
   Minneapolis, Minnesota —HC-95183
9. Trustees of Columbia University of New York
   New York, New York —HC-95184

Cardiovascular Cell Therapy Research Network, Initiated in Fiscal Year 2007

The purpose of this program is to establish a research network to evaluate innovative cell therapy treatment strategies for individuals with CVD. The network will provide the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate application of emerging scientific discoveries to improve CVD outcomes.

Obligations

Funding History:
Fiscal Year 2008—$7,568,262
Fiscal Year 2007—$4,424,183
Total Funding to Date—$11,992,445

Current Active Organizations and Grant Numbers

1. Case Western Reserve University
   Cleveland, Ohio —HL-087314
2. University of Texas Health Science Center
   Houston, Texas —HL-087318
3. Texas Heart Institute
   Houston, Texas —HL-087365
4. University of Florida
   Gainesville, Florida —HL-087366
5. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-087394
6. Vanderbilt University
   Nashville, Tennessee —HL-087403

Clinical Research Consortium To Improve Resuscitation Outcomes, Initiated in Fiscal Year 2004

The purpose of this study is to establish a resuscitation research consortium to conduct research in cardiopulmonary arrest and traumatic injury leading to arrest. The consortium will facilitate the rapid translation of promising scientific and clinical advances to improve resuscitation outcomes.

Obligations

Funding History:
Fiscal Year 2008—$5,279,451
Fiscal Years 2004–2007—$34,924,311
Total Funding to Date—$40,203,762

Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —HL-077863
2. University of Iowa
   Iowa, City, Iowa —HL-077865
3. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-077866
4. University of Washington
   Seattle, Washington —HL-077867
5. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-077871

6. St. Michael's Hospital
   Toronto, Ontario —HL-077872
7. Oregon Health and Science University
   Portland, Oregon —HL-077873
8. University of Alabama at Birmingham
   Birmingham, Alabama —HL-077881
9. Ottawa Health Research Institute
   Ottawa, Ontario —HL-077885
10. University of Texas
    Southwestern Medical Center
    Dallas, Texas —HL-077887
11. University of California, San Diego
    La Jolla, California —HL-077908

Clinical Trials in Organ Transplantation (CTOT), Initiated in Fiscal Year 2005

The purpose of this program is to support a multisite consortium for interventional or observational clinical studies to enhance our understanding of, and ultimately reduce, the immune-mediated morbidity and mortality of organ transplantation.

Obligations

Funding History:
Fiscal Year 2008—$1,635,346
Fiscal Years 2005–2007—$5,556,895
Total Funding to Date—$7,192,241

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
   Philadelphia, Pennsylvania —AI-063589
2. Mount Sinai School of Medicine
   New York, New York —AI-063594
3. Brigham and Women's Hospital
   Boston, Massachusetts —AI-063623

Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives, Initiated in Fiscal Year 2006

The purpose of this program is to develop and evaluate the effectiveness of culturally appropriate interventions to promote the adoption of healthy life-style behaviors to reduce CVD risk in American Indian/ Alaska Native communities. Interventions will focus on weight reduction, regular physical activity, and smoking cessation. A central feature of this project is to develop interventions that can be incorporated into clinical programs of the community health care system or delivered through public health approaches in Native communities.

Obligations

Funding History:
Fiscal Year 2008—$3,150,539
Fiscal Years 2006–2007—$3,732,749
Total Funding to Date—$6,883,288

Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —HL-087322
2. University of Oklahoma Health Sciences Center
   Oklahoma City, Oklahoma —HL-087354
3. University of Wisconsin—Madison
   Madison, Wisconsin —HL-087381
4. Black Hills Center/American Indian Health
   Rapid City, South Dakota —HL-087422

Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006

The purpose of this network is to accelerate research in the diagnosis and management of heart failure in order to improve outcomes through optimal application of existing therapies and evaluation of novel therapies. The network will provide the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate application of emerging basic science discoveries into clinical investigations.

Obligations

Funding History:
Fiscal Year 2008—$7,813,234
Fiscal Years 2006–2007—$13,443,043
Total Funding to Date—$21,256,277

Current Active Organizations and Grant Numbers

1. Minneapolis Medical Research Foundation, Inc.
   Minneapolis, Minnesota —HL-084861
2. Duke University
   Durham, North Carolina —HL-084875
3. Brigham and Women's Hospital
   Boston, Massachusetts —HL-084877
4. University of Utah
   Salt Lake City, Utah —HL-084889
5. Baylor College of Medicine
   Houston, Texas —HL-084890
6. Morehouse School of Medicine
   Atlanta, Georgia —HL-084891
7. University of Vermont and State Agriculture College
   Burlington, Vermont —HL-084899

8. Duke University
   Durham, North Carolina —HL-084904
9. Mayo Clinic College of Medicine
   Rochester, Minnesota —HL-084907
10. Montreal Heart Institute
    Montreal, Quebec, Canada —HL-084931

Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine, Initiated in Fiscal Year 2007

The purpose of this program is to establish a network to evaluate newer surgical techniques, technologies, devices, and innovative pharmaceutical and bioengineered products directed at CVD to ensure that the public has access to the best procedures determined by careful assessment. The Network will also serve as a clinical trials training ground for fellows and junior faculty.

Obligations

Funding History:
Fiscal Year 2008—$8,861,013
Fiscal Year 2007—$6,008,848
Total Funding to Date—$14,689,861

Current Active Organizations and Grant Numbers

1. University of Virginia, Charlottesville
   Charlottesville, Virginia —HL-088925
2. Emory University
   Atlanta, Georgia —HL-088928
3 Yeshiva University
   Bronx, New York —HL-088939
4. Columbia University Health Sciences
   New York, New York —HL-088942
5. Columbia University Health Sciences
   New York, New York —HL-088951
6. Duke University
   Durham, North Carolina —HL-088953
7. Case Western Reserve University
   Cleveland, Ohio —HL-088955
8. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-088957
9. Montreal Heart Institute
   Montreal, Quebec, Canada —HL-088963

Pediatric Heart Network, Initiated in Fiscal Year 2001

The objective of this study is to establish a clinical network to evaluate novel treatment methods and management strategies for children with structural congenital heart disease, inflammatory heart disease, heart muscle disease, or arrhythmias.

Obligations

Funding History:
Fiscal Year 2008—$12,254,539
Fiscal Years 2001–2007—$36,186,196
Total Funding to Date—$48,440,735

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-068269
2. New England Research Institute, Inc.
   Watertown, Massachusetts —HL-068270
3. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-068279
4. Medical University of South Carolina
   Charleston, South Carolina —HL-068281
5. Children's Hospital
   Boston, Massachusetts —HL-068285
6. Hospital for Sick Children
   Toronto, Ontario —HL-068288
7. Columbia University Health Sciences
   New York, New York —HL-068290
8. University of Utah
   Salt Lake City, Utah —HL-068292
9. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-085057

Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center, Initiated in Fiscal Year 2006

The purpose of this study is to create a body of data to understand more fully the effect of HIV on sexual maturation, pubertal development, and socialization of perinatally HIV-infected preadolescents and adolescents, and to acquire more definitive information regarding long-term safety of antiretroviral agents when used during pregnancy and in newborns.

Obligations

Funding History:
Fiscal Year 2008—$490,000
Fiscal Years 2006–2007—$1,500,000
Total Funding to Date—$1,990,000

Current Active Organization and Grant Number

1. Harvard University
   Boston, Massachusetts —HD-052102

Practice-Based Opportunity for Weight Reduction (POWER) Trials,* Initiated in Fiscal Year 2006

The purpose of this study is to conduct randomized clinical trials in routine clinical practice settings to test the effectiveness of weight loss interventions in obese patients who have one or more additional cardiovascular risk factors. An important secondary focus of these effectiveness clinical trials is to incorporate the weight loss strategies with approaches to improve application of evidence-based guidelines to reduce the other cardiovascular risk factors commonly present in obese patients, such as elevated lipids, hypertension, metabolic syndrome, diabetes, or cigarette smoking. All of the participants will be from minority populations.

Obligations

Funding History:
Fiscal Year 2008—$3,656,172
Fiscal Years 2006–2007—$6,281,092
Total Funding to Date—$9,937,264

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-087071
2. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-087072
3. Johns Hopkins University
   Baltimore, Maryland —HL-087085

Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT), Initiated in Fiscal Year 2004

The purpose of this study is to evaluate the effectiveness of aldosterone antagonist therapy to reduce mortality in patients who have heart failure with preserved systolic function.

Obligations

Funding History:
Fiscal Year 2008—$7,912,414
Fiscal Years 2004–2007—$13,696,387
Total Funding to Date—$21,608,801

Current Active Organization and Contract Number

1. New England Research Institutes, Inc.
   Watertown, Massachusetts —HC-45207

Women's Health Initiative, Initiated in Fiscal Year 1992

The purpose of the WHI is to study cardiovascular disease, cancer, and osteoporosis in postmenopausal women. The program consists of three major components: a randomized controlled clinical trial of HRT, dietary modification, and calcium/vitamin D supplementation; an observational study to identify predictors of disease; and a study of community approaches to developing healthful behaviors.

In 2007, the WHI began a program to maximize the scientific yield from the biologic resources and associated participant exposure and outcome data from the study. The program seeks innovative technologies that will enable comprehensive investigation of sets of markers associated with disease outcomes or treatment effects, or of groups of mediators that might explain the pathway of exposure or treatment effects on disease outcomes.

Obligations

Funding History:
Fiscal Year 2008—$22,608,710
Fiscal Years 1992–2007**—$737,438,335
Total Funding to Date—$760,047,045

Current Active Organizations and Contract Numbers

1. Fred Hutchinson Cancer Research Center
   Seattle, Washington —WH-22110
2. University of Medicine and Dentistry of New Jersey
   Newark, New Jersey —WH-24152
3. Fred Hutchinson Cancer Research Center
   Seattle, Washington —WH-32100
4. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —WH-32101
5. University of Iowa
   College of Medicine
   Iowa City, Iowa —WH-32102
6. University of Alabama at Birmingham
   Birmingham, Alabama —WH-32105

* Formerly known as Weight-Loss in Obese Adults With Cardiovascular Risk Factors.

** This figure reflects funding for the clinical trials and observational studies only. From 1992 to 1998, major support was provided through the Office of the Director, NIH. The Community Prevention Study receives funding through an inter-Agency agreement with the CDC: $4,000,000 in FY 1999 and $12,000,000 from FY 1996–98.

7. Wake Forest University
   Winston-Salem, North Carolina —WH-32106
8. Northwestern University
   Chicago, Illinois —WH-32108
9. Brigham and Women's Hospital
   Boston, Massachusetts —WH-32109
10. Emory University
    Atlanta, Georgia —WH-32111
11. University of Pittsburgh
    Pittsburgh, Pennsylvania —WH-32112
12. University of California, Davis
    Davis, California —WH-32113
13. University of Arizona
    Tucson, Arizona —WH-32115
14. University of Tennessee
    Memphis, Tennessee —WH-32118
15. Memorial Hospital of Rhode Island
    Pawtucket, Rhode Island —WH-32119
16. State University of New York at Buffalo
    Buffalo, New York —WH-32122
17. University of California, Irvine
    Irvine, California —WH-42107
18. George Washington University
    Washington, DC —WH-42108
19. Stanford University
    Stanford, California —WH-42109
20. Baylor College of Medicine
    Houston, Texas —WH-42110
21. University of Texas
    Health Science Center
    San Antonio, Texas —WH-42111
22. Ohio State University
    Columbus, Ohio —WH-42112
23. University of Nevada
    School of Medicine
    Reno, Nevada —WH-42113
24. Kaiser Foundation Research Institute
    Oakland, California —WH-42114
25. State University of New York at
    Stony Brook
    Stony Brook, New York —WH-42115
26. University of Massachusetts Medical
    School
    Worcester, Massachusetts —WH-42116
27. University of North Carolina at
    Chapel Hill
    Chapel Hill, North Carolina —WH-42117
28. Wayne State University
    Detroit, Michigan —WH-42118
29. Albert Einstein College of Medicine
    New York, New York —WH-42119
30. Harbor-UCLA Research and Education
    Institute
    Torrance, California —WH-42120
31. Kaiser Foundation Research Institute
    Oakland, California —WH-42121
32. Medical College of Wisconsin
    Milwaukee, Wisconsin —WH-42122
33. MedStar Research Institute
    Washington, DC —WH-42123
34. Rush-Presbyterian-St. Luke's
    Medical Center
    Chicago, Illinois —WH-42124
35. University of California, Los Angeles
    Los Angeles, California —WH-42125
36. University of Cincinnati
    Medical Center
    Cincinnati, Ohio —WH-42126
37. University of Florida
    College of Medicine
    Gainesville, Florida —WH-42129
38. University of Hawaii at Manoa
    Honolulu, Hawaii —WH-42130
39. University of Miami
    Miami, Florida —WH-42131
40. University of Wisconsin
    Madison, Wisconsin —WH-42132
41. Wake Forest University
    Winston-Salem, North Carolina —WH-44221
42. Albert Einstein College of Medicine
    New York, New York —WH-74310
43. Brigham and Women's Hospital
    Boston, Massachusetts —WH-74311
44. California Pacific Medical Center
    San Francisco, California —WH-74312
45. Fred Hutchinson Cancer Research Center
    Seattle, Washington —WH-74313
46. Fred Hutchinson Cancer Research Center
    Seattle, Washington —WH-74314
47. Fred Hutchinson Cancer Research Center
    Seattle, Washington —WH-74315
48. The Ohio State University
    Columbus, Ohio —WH-74316
49. Tufts University
    Boston, Massachusetts —WH-74317
50. University of Pittsburgh
    Pittsburgh, Pennsylvania —WH-74318
51. University of California, Davis
    Davis, California —WH-74319
52. University of Pittsburgh
    Pittsburgh, Pennsylvania —WH-74320
53. Wake Forest University
    Winston-Salem, North Carolina —WH-74321

Lung Diseases Program

Acute Respiratory Distress Syndrome Clinical Network (ARDSNet), Initiated in Fiscal Year 1994

The purpose of this network is to develop and conduct randomized controlled clinical trials to prevent, treat, and improve the outcome of patients with acute lung injury, ARDS, and other related critical illnesses.

Obligations

Funding History:
Fiscal Year 2008—$1,991,538
Fiscal Years 1994–2007—$63,348,358
Total Funding to Date—$65,339,896

Current Active Organizations and Contract Numbers

1. Baystate Medical Center
   Springfield, Massachusetts —HR-56165
2. University of California, San Francisco
   San Francisco, California —HR-56166
3. University of Colorado
   Health Sciences Center
   Denver, Colorado —HR-56167
4. Cleveland Clinic Lerner College of
   Medicine-Case Western Reserve University
   Cleveland, Ohio —HR-56168
5. Duke University Medical Center
   Durham, North Carolina —HR-56169
6. John Hopkins University
   Baltimore, Maryland —HR-56170
7. LDS Hospital
   Salt Lake City, Utah —HR-56171
8. Louisiana State University
   New Orleans, Louisiana —HR-56172
9. University of Washington
   Seattle, Washington —HR-56173
10. Vanderbilt University Medical Center
    Nashville, Tennessee —HR-56174
11. Wake Forest University Health Sciences
    Winston-Salem, North Carolina —HR-56175
12. Mayo Clinic College of Medicine
    Rochester, Minnesota —HR-56176
13. Massachusetts General Hospital
    Boston, Massachusetts —HR-56179

Asthma Clinical Research Network (ACRN), Phase II, Initiated in Fiscal Year 2003

The purpose of this network is to evaluate current and novel therapies and management strategies for adult asthma and to ensure that findings are rapidly disseminated to the medical community. Approximately 33 percent of the participants will be minorities.

Obligations

Funding History:
Fiscal Year 2008—$872,328
Fiscal Years 2003–2007—$42,028,773
Total Funding to Date—$42,901,101

Current Active Organizations and Grant Numbers

1. National Jewish Medical and Research
   Center
   Denver, Colorado —HL-074073
2. University of California, San Francisco
   San Francisco, California —HL-074204
3. University of Texas Medical Branch
   Galveston, Texas —HL-074206
4. Washington University
   St. Louis, Missouri —HL-074208
5. University of Wisconsin
   Madison, Wisconsin —HL-074212
6. University of California, San Diego
   La Jolla, California —HL-074218
7. Wake Forest University Health Sciences
   Winston-Salem, North Carolina —HL-074225
8. Brigham and Women's Hospital
   Boston, Massachusetts —HL-074227
9. Pennsylvania State University
   Hershey Medical Center
   Hershey, Pennsylvania —HL-074231

Childhood Asthma Research and Education (CARE) Network, Initiated in Fiscal Year 1999

The purpose of this clinical network is to evaluate current and novel therapies and management strategies for children with asthma. Emphasis is on clinical trials that help identify optimal therapy for children with different asthma phenotypes, genotypes, and ethnic backgrounds and children at different developmental stages.

Obligations

Funding History:
Fiscal Year 2008—$4,887,330
Fiscal Years 1999–2007—$48,753,133
Total Funding to Date—$53,640,463

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-064287

2. National Jewish Medical and Research Center
Denver, Colorado —HL-064288
3. University of California, San Diego
La Jolla, California —HL-064295
4. University of Wisconsin
Madison, Wisconsin —HL-064305
5. University of Arizona
Tucson, Arizona —HL-064307
6. Pennsylvania State University
Hershey, Pennsylvania —HL-064313

COPD Clinical Research Network, Initiated in Fiscal Year 2003

The purpose of this network is to investigate disease management approaches in patients with moderate-to-severe COPD and to ensure that the findings are rapidly disseminated to the medical community.

Obligations

Funding History:
Fiscal Year 2008—$3,400,000
Fiscal Years 2003–2007—$ 36,630,386
Total Funding to Date—$40,030,386

Current Active Organizations and Grant Numbers

1. Harbor-UCLA Research and Education Institute
Torrance, California —HL-074407
2. Temple University
Philadelphia, Pennsylvania —HL-074408
3. Denver Health and Hospital Authority
Denver, Colorado —HL-074409
4. Minnesota Veterans Research Institute
Minneapolis, Minnesota —HL-074416
5. University of Alabama at Birmingham
Birmingham, Alabama —HL-074418
6. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-074422
7. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-074424
8. Brigham and Women's Hospital
Boston, Massachusetts —HL-074428
9. University of California, San Francisco
San Francisco, California —HL-074431
10. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-074439
11. University of Maryland
Baltimore Professional School
Baltimore, Maryland —HL-074441

Idiopathic Pulmonary Fibrosis Clinical Research Network, Initiated in Fiscal Year 2005

The purpose of this network is to establish six to seven clinical centers to design and perform multiple therapeutic trials for treatment of patients with newly diagnosed idiopathic pulmonary fibrosis and a Data Coordinating Center for the network.

Obligations

Funding History:
Fiscal Year 2008—$7,154,215
Fiscal Years 2005–2007—$18,051,677
Total Funding to Date—$25,205,892

Current Active Organizations and Grant Numbers

1. Mayo Clinic College of Medicine
Rochester, Minnesota —HL-080274
2. Vanderbilt University
Nashville, Tennessee —HL-080370
3. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-080371
4. Weill Medical College of Cornell University
New York, New York —HL-080383
5. University of California, Los Angeles
Los Angeles, California —HL-080411
6. Duke University
Durham, North Carolina —HL-080413
7. University of Washington
Seattle, Washington —HL-080509
8. Tulane University of Louisiana
New Orleans, Louisiana —HL-080510
9. University of Chicago
Chicago, Illinois —HL-080513
10. Emory University
Atlanta, Georgia —HL-080543
11. National Jewish Medical and Research Center
Denver, Colorado —HL-080571
12. University of California, San Francisco
San Francisco, California —HL-080685

Long-Term Oxygen Treatment Trial (LOTT), Initiated in Fiscal Year 2007

The purpose of this program is to determine the effectiveness and safety of long-term, home-administered oxygen therapy in patients with COPD. Approximately 3,200 patients with moderate COPD will be enrolled to determine whether supplemental oxygen can improve their quality of life and extend their lifespan. Research findings will help Medicare decide whether to extend

coverage for home oxygen treatment for patients with moderately severe disease.

Obligations

Funding History:
Fiscal Year 2008—$10,041,750
Fiscal Year 2007—$6,208,395
Total Funding to Date—$16,250,145

Current Active Organizations and Contract Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HR-76183
2. Cleveland Clinic Foundation
Cleveland, Ohio —HR-76184
3. Denver Health and Hospital Authority
Denver, Colorado —HR-76185
4. Duke University Medical Center
Durham, North Carolina —HR-76186
5. Kaiser Foundation Hospitals
Portland, Oregon —HR-76187
6. Los Angeles Biomedical Institute/Harbor-UCLA
Los Angeles, California —HR-76188
7. The Ohio State University
Columbus, Ohio —HR-76189
8. Temple University
Philadelphia, Pennsylvania —HR-76190
9. University of Alabama at Birmingham
Birmingham, Alabama —HR-76191
10. University of Michigan
Ann Arbor, Michigan —HR-76192
11. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-76193
12. University of Utah
Salt Lake City, Utah —HR-76194
13. University of Washington
Seattle, Washington —HR-76195
14. Washington University
St. Louis, Missouri —HR-76196
15. Johns Hopkins University
Baltimore, Maryland —HR-76197

NICHD Cooperative Multicenter Neonatal Research Network, Initiated in Fiscal Year 2006

The purpose of this network is to investigate the safety and efficacy of treatment and management strategies to care for newborn infants, particularly those related to management of low-birth-weight infants. The objective of this program is to facilitate evaluation of the strategies by establishing a network of academic centers that, by rigorous patient evaluation using common protocols, can study the required numbers of patients and can provide answers more rapidly than individual centers acting alone.

Obligations

Funding History:
Fiscal Year 2008—$27,440
Fiscal Years 2006–2007—$1,573,806
Total Funding to Date—$1,601,246

Current Active Organizations and Grant Numbers

1. Case Western Reserve University
Cleveland, Ohio —HD-021364
2. University of Texas Health Science Center
Houston, Texas —HD-021373
3. Wayne State University
Detroit, Michigan —HD-021385
4. Emory University
Atlanta, Georgia —HD-027851
5. Children's Hospital Medical Center
Cincinnati, Ohio —HD-027853
6. Indiana University-Purdue University at Indianapolis
Indianapolis, Indiana —HD-027856
7. Yale University
New Haven, Connecticut —HD-027871
8. Stanford University
Stanford, California —HD-027880
9. Women and Infants Hospital
Providence, Rhode Island —HD-027904
10. University of Alabama at Birmingham
Birmingham, Alabama —HD-034216
11. University of California
San Diego, California —HD-040461
12. Duke University
Durham, North Carolina —HD-040492
13. University of Texas Southwestern Medical Center
Dallas, Texas —HD-040689
14. University of New Mexico
Albuquerque, New Mexico —HD-053089
15. University of Iowa
Iowa City, Iowa —HD-053109
16. New England Medical Center Hospitals
Boston, Massachusetts —HD-053119
17. University of Utah
Salt Lake City, Utah —HD-053124

Blood Diseases and Resources Program

Blood and Marrow Transplant Clinical Research Network, Initiated in Fiscal Year 2001

The purpose of this network is to promote the efficient comparison of novel treatment methods and management strategies of potential benefit for children and adults undergoing blood or marrow transplantation.

Obligations

Funding History:
Fiscal Year 2008—$6,951,519
Fiscal Years 2001–2007—$43,195,601
Total Funding to Date—$50,147,120

Current Active Organizations and Grant Numbers

1. University of Nebraska Medical Center
   Omaha, Nebraska —HL-069233
2. Fred Hutchinson Cancer Research Center
   Seattle, Washington —HL-069246
3. Dana Farber Cancer Institute
   Boston, Massachusetts —HL-069249
4. National Childhood Cancer Foundation
   Arcadia, California —HL-069254
5. University of California, San Diego
   La Jolla, California —HL-069273
6. Duke University
   Durham, North Carolina —HL-069274
7. City of Hope Medical Center
   Duarte, California —HL-069278
8. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-069286
9. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-069290
10. Stanford University
    Stanford, California —HL-069291
11. Medical College of Wisconsin
    Milwaukee, Wisconsin —HL-069294
12. University of Florida
    Gainesville, Florida —HL-069301
13. Johns Hopkins University
    Baltimore, Maryland —HL-069310
14. Sloan Kettering Institute
    for Cancer Research
    New York, New York —HL-069315
15. University of Michigan at Ann Arbor
    Ann Arbor, Michigan —HL-069330
16. University of Texas
    M.D. Anderson Cancer Center
    Houston, Texas —HL-069334
17. Case Western Reserve University
    Cleveland, Ohio —HL-069348

Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG), Initiated in Fiscal Year 2000

The objective of this clinical trial is to determine if hydroxyurea therapy is effective in prevention of chronic end organ damage in pediatric patients with sickle cell anemia.

Obligations

Funding History:
Fiscal Year 2008—$5,573,216
Fiscal Years 2000–2007—$14,570,399
Total Funding to Date—$20,143,615

Current Active Organizations and Contract Numbers

1. Children's Research Institute
   Washington, DC —HB-07150
2. Duke University Medical Center
   Durham, North Carolina —HB-07151
3. Howard University
   Washington, DC —HB-07152
4. Johns Hopkins University
   Baltimore, Maryland —HB-07153
5. Medical University of South Carolina
   Charleston, South Carolina —HB-07154
6. St. Jude Children's Research Hospital
   Memphis, Tennessee —HB-07155
7. The Research Foundation of SUNY
   New York, New York —HB-07156
8. University of Miami
   Miami, Florida —HB-07157
9. University of Mississippi Medical Center
   Jackson, Mississippi —HB-07158
10. University of Texas
    Southwestern Medical Center
    Dallas, Texas —HB-07159
11. Clinical Trials and Surveys Corporation
    Baltimore, Maryland —HB-07160

Sickle Cell Disease Clinical Research Network, Initiated in Fiscal Year 2006

The purpose of this clinical research network is to conduct Phase III randomized controlled clinical trials to test the efficacy and effectiveness of new therapies to treat and prevent complications of SCD, and when appropriate, thalassemia. In addition, the network is designed to create data sets that can be used to improve characterization of patients and their clinical course, apply genomic and proteomic techniques for improved diagnostic and therapeutic approaches, and expand the clinical application of multimodal therapies in SCD.

Obligations

Funding History:
Fiscal Year 2008—$7,172,797
Fiscal Years 2006–2007—$11,259,232
Total Funding to Date—$18,432,029

Current Active Organizations and Contract Numbers

1. Duke University
   Durham, North Carolina —HL-083698
2. Emory University
   Atlanta, Georgia —HL-083699
3. Children's Hospital and Research Center
   Oakland, California —HL-083704
4. Drexel University
   Philadelphia, Pennsylvania —HL-083705
5. New England Research Institutes, Inc.
   Watertown, Massachusetts —HL-083721
6. University of Illinois at Chicago
   Chicago, Illinois —HL-083730
7. Virginia Commonwealth University
   Richmond, Virginia —HL-083732
8. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-083746
9. Howard University
   Washington, DC —HL-083748
10. Boston Medical Center
    Boston, Massachusetts —HL-083771

Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension, Initiated in Fiscal Year 2006

The purpose of this clinical trial is to evaluate the safety and efficacy of 18 weeks of therapy with sildenafil, a nitric oxide potentiator, in adult patients with SCD and pulmonary hypertension; exercise endurance and pulmonary artery pressure will be measured. Pulmonary hypertension occurs in up to 30 percent of SCD cases and is strongly associated with mortality in adults with SCD.

Obligations

Funding History:
Fiscal Year 2008—$3,701,968
Fiscal Years 2006–2007—$4,668,174
Total Funding to Date—$8,370,142

Current Active Organizations and Contract Numbers

1. Rho Federal Systems Division, Inc.
   Chapel Hill, North Carolina —HB-67182
2. Imperial College of London
   London, England —HB-67183
3. Children's Hospital of Pittsburgh
   Pittsburgh, Pennsylvania —HB-67184
4. University of Colorado
   Denver, Colorado —HB-67185
5. Children's Hospital and Research Center at Oakland
   Oakland, California —HB-67186
6. University of Illinois at Chicago
   Chicago, Illinois —HB-67187
7. Johns Hopkins University
   Baltimore, Maryland —HB-67188
8. Howard University
   Washington, DC —HB-67189
9. Albert Einstein College of Medicine
   New York, New York —HB-67190

Thalassemia (Cooley's Anemia) Clinical Research Network, Initiated Fiscal Year 2000

The purpose of this network is to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones in a network of clinical centers.

Obligations

Funding History:
Fiscal Year 2008—$2,600,482
Fiscal Years 2000–2007—$19,405,539
Total Funding to Date—$22,006,021

Current Active Organizations and Grant Numbers

1. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-065232
2. Hospital for Sick Children
   Toronto, Ontario —HL-065233
3. New England Research Institute, Inc.
   Watertown, Massachusetts —HL-065238
4. Children's Hospital and Research Center at Oakland
   Oakland, California —HL-065239
5. Weill Medical College of Cornell University
   New York, New York —HL-065244
6. Children's Hospital
   Boston, Massachusetts —HL-065260

Transfusion Medicine/Hemostasis Clinical Research Network, Initiated in Fiscal Year 2002

The purpose of this network is to promote the efficient comparison of new management strategies for individuals with hemostatic disorders, such as idiopathic thrombocytopenia and thrombotic thrombocytopenic purpura, and to evaluate new and existing blood products and cytokines for treatment of hematologic disorders.

Obligations

Funding History:
Fiscal Year 2008—$6,373,860
Fiscal Years 2002–2007—$37,535,254
Total Funding to Date—$43,909,114

Current Active Organizations and Grant Numbers

1. University of Iowa
   Iowa City, Iowa —HL-072028
2. Case Western Reserve University
   Cleveland, Ohio —HL-072033
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-072072
4. Johns Hopkins University
   Baltimore, Maryland —HL-072191
5. Weill Medical College of
   Cornell University
   New York, New York —HL-072196
6. Emory University
   Atlanta, Georgia —HL-072248
7. New England Research Institutes, Inc.
   Watertown, Massachusetts —HL-072268
8. Tulane University of Louisiana
   New Orleans, Louisiana —HL-072274
9. University of Oklahoma
   Health Sciences Center
   Oklahoma City, Oklahoma —HL-072283
10. Duke University
    Durham, North Carolina —HL-072289
11. Blood Center of Southeastern Wisconsin
    Milwaukee, Wisconsin —HL-072290
12. Children's Hospital
    Boston, Massachusetts —HL-072291
13. Massachusetts General Hospital
    Boston, Massachusetts —HL-072299
14. Puget Sound Blood Center
    Seattle, Washington —HL-072305
15. University of Pittsburgh
    Pittsburgh, Pennsylvania —HL-072331
16. University of Pennsylvania
    Philadelphia, Pennsylvania —HL-072346
17. University of North Carolina at
    Chapel Hill
    Chapel Hill, North Carolina —HL-072355
18. University of Maryland
    Baltimore Professional School
    Baltimore, Maryland —HL-072359

12. Minority Activities

Throughout its history, the NHLBI has been a leader in conducting and supporting research to eliminate health disparities that exist between various segments of the U.S. population. The Institute has not only initiated research projects with significant minority participation in order to compare health status between various populations, but also given high priority to programs that focus exclusively on minority health issues.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Women and Minorities as Subjects in Clinical Research. As a result, all NHLBI-supported research that involves human subjects includes minorities, with the exception of a very few projects for which a compelling justification for limited diversity in the study population exists. Thus, all segments of the population, minority and nonminority, women, and children, stand to benefit from the Institute's research programs.

It has long been a goal of the NHLBI to increase the number of individuals from underrepresented groups in biomedical and behavioral research. Selected FY 2008 activities addressing this goal include the following:

- Minority K–12 Initiative for Teachers and Students (MKITS): Supports research, development, and evaluation of innovative science training programs to provide minority students in grades K–12 with the exposure, skills, and knowledge that will encourage them to pursue advanced studies in biomedical and behavioral sciences.
- Historically Black College and University (HBCU) Research Scientist Award and the Research Scientist Award for Minority Institutions: Strengthens the biomedical and behavioral research capabilities and resources of HBCUs or minority institutions by recruiting an established research scientist in areas related to cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders.
- Sickle Cell Scholars Program: Supports career development of young or new investigators in SCD research as part of the BTRP.
- Summer for Sickle Cell Science Program: Supports research training and mentoring of individuals at the high school level as part of the BTRP.
- Clinical Research Education and Career Development in Minority Institutions: Encourages the development and implementation of curriculum-dependent programs in minority institutions to train selected doctoral and postdoctoral candidates in clinical research leading to a Master of Science Degree in Clinical Research or Master of Public Health Degree in a clinically relevant area.
- Minority Undergraduate Biomedical Education Program: Encourages development of pilot demonstration programs at minority undergraduate educational institutions to recruit and retain talented undergraduate students in the biomedical sciences.
- Summer Institute Program To Increase Diversity in Health-Related Research: Enables faculty and scientists from underrepresented racial and ethnic groups or with disabilities to advance their research skills and knowledge in basic and applied sciences relevant to heart, lung, and blood diseases and sleep disorders, so that they can compete for funding for scientific research in the biomedical and behavioral sciences.

The Office of Research Training and Minority Health (ORTMH) within the Office of the Director provides oversight for, and coordinates, supports, and evaluates Institute programs related to minority health outcomes, including research, research training and career development, public outreach, and translation of research findings. The ORTMH also coordinates activities to foster greater participation of underrepresented minorities in NHLBI research and

research training and career development programs. Selected FY 2008 activities include the following:

- Issuing four training and career development RFAs to increase the number of highly trained minorities conducting biomedical and behavioral research. Additional targeted groups include individuals from disadvantaged backgrounds and individuals with disabilities.
- Participating in HHS-Endorsed Minority Organization Internship Programs by supporting positions in NHLBI extramural and intramural divisions for students from the National Association for Equal Opportunity in Higher Education, the Hispanic Association of Colleges and Universities, the Washington Internships for Native Students programs, and the Directors of Health Promotion and Education Internship Program/CDC.
- Cosponsoring with the NIH, the Cherokee Elementary School Project: Out of the Box, which is designed to create awareness and interest in the importance of science, medicine, and health; eliminate gaps in quality of health among minorities by encouraging health-related careers; and encourage children to take responsibility for their own health.
- Supporting the African American, Hispanic, and Native American Youth Initiatives to bring minority students to the NIH campus for scientific presentations, an introduction to NHLBI research training and career development programs, and a tour of NHLBI laboratories.
- Providing undergraduate students from the Tougaloo College Scholars program an opportunity to learn about the NIH, biomedical research, and research training opportunities at the NHLBI during a 3-day tour of the NIH.
- Serving as a Web site resource for recruitment of minority individuals into the Ruth L. Kirschstein Institutional National Research Service Award (T32).
- Increasing recruitment of individuals for the NHLBI intramural and extramural training programs by representing the Institute at five minority-focused research meetings to raise awareness of research and research training and career development opportunities available from the NHLBI.
- Coordinating the Biomedical Research Training Program for Individuals From Underrepresented Groups, which offers opportunities for underrepresented undergraduate, postbaccalaureate, and graduate students to receive training in fundamental biomedical sciences and clinical research as they relate to the etiology and treatment of heart, blood vessel, lung, and blood diseases and sleep disorders.
- Serving as the NHLBI contact for guidance to candidates applying for the NIH Pathway to Independence (PI) Award (K99/R00) and the NHLBI Career Transition Award (K22) for extramural programmatic issues.

See Chapter 13 for additional NHLBI-supported minority research training and career development programs.

The following text describes selected current projects that focus on minority populations and reflect the Institute's research portfolio related to minority health. Additional information can be found in Chapters 9 through 11.

Heart and Vascular Diseases

Risk Factors

Epidemiology

Long-term epidemiologic studies are critical to uncovering risk factors that lead to disease. The Institute has initiated several major studies of heart disease focused significantly or completely on minority populations.

- CARDIA (see Chapter 10): To determine the evolution of CHD risk factors and lifestyle characteristics in young adults that may influence development of risk factors prior to middle age; 50 percent of the participants are black.
- ARIC (see Chapter 10): To investigate the association of CHD risk factors with development of atherosclerosis and CVD in an adult population; 30 percent of the participants are black.
- CHS (see Chapter 10): To examine risk factors for CHD and stroke in the elderly; 16 percent of the participants are black.
- Strong Heart Study (see Chapter 9): To compare risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.

- JHS (see Chapter 10): To identify environmental and genetic factors influencing evolution and progression of CVD in blacks.
- MESA (see Chapter 10): To examine the characteristics of subclinical CVD that predict progression to clinically overt CVD and related risk factors that predict subclinical disease in blacks, whites, Hispanics, and Asians; 62 percent of the participants are minorities.
- GOCADAN (see Chapter 9): To document CVD risk factors and measures of subclinical disease and to identify and characterize genes that contribute to CVD in approximately 40 extended Alaska Native families.
- HCHS (see Chapter 10): To identify risk factors for cardiovascular and lung disease in Hispanic populations in the United States and determine the role of acculturation in their prevalence and development.

The Institute supports components of the NHANES that track the prevalence of disease and risk factors for cardiovascular and lung diseases by race and ethnicity in the U.S. population.

Several investigator-initiated epidemiologic studies are examining gene–environment interactions that increase CVD risk factors among various racial groups. Included among them are studies that compare gene–environment interactions in black populations in Africa, the Caribbean, and selected areas of the United States; determine the genes responsible for the metabolic syndrome, a risk factor for CVD, in 10,000 Chinese sibling pairs; determine the genes responsible for CVD risk factor response to dietary fat changes in blacks; and identify and map specific genes that contribute to CVD risk in Mexican Americans.

Scientific evidence is emerging that implicates cellular and inflammatory processes in the development and characteristics of atherosclerotic plaque and the clinical course of CVD. One study seeks to identify cellular, metabolic, and genomic correlates of atherosclerotic plaque characteristics and early changes in the vascular wall in a subset of the ARIC cohort; one-third of participants are black. Another study is elucidating the links between socioeconomic factors, stress, inflammation and hemostasis, and cardiovascular risk in a large and diverse population.

Several drugs in four widely used classes of non-cardiovascular medications (fluoroquinolone and macrolide antibiotics, antipsychotics, and antidepressants) have been shown to be proarrhythmic and thus increase the risk of sudden cardiac death. Investigators are conducting a study, using a large and comprehensive dataset of about 800,000 persons, 40 percent of whom are black, to understand the role of those medications on the risk of sudden cardiac death. Research findings are expected to provide information that will enable clinicians to prescribe these widely used medications in a way that minimizes the risk of sudden cardiac death.

Ancillary studies to MESA are investigating subclinical CVD in ethnic minority groups. They include investigations of regional left ventricular function, progression of calcification in the aorta, abnormalities in the small vessels of the retina, association of air pollution and subclinical CVD, lung function in relation to endothelial dysfunction and biomarkers, identification of genes for subclinical CVD, and relationships of sociodemographic factors and other factors to subclinical CVD.

The Institute is supporting additional epidemiologic investigations that include a project to use pooled data from nine existing U.S. studies to compare between blacks and whites, CHD incidence and mortality rates, exposure–outcome relationships, patterns of comorbidity, and population attributable risk; and a study to evaluate and compare the extent of atherosclerosis and risk factors for CHD in three different populations: U.S. (75 percent white and 25 percent black), Japanese Americans in Hawaii, and Japanese in Japan.

Treatment and Prevention

Low-dose aspirin is cost effective and efficacious for the prevention and treatment of CHD. However, some individuals, perhaps because of individual genetic variations, do not respond to the treatment. A genetic study in high-risk siblings of patients with premature CHD, along with their adult offspring, is seeking to determine whether low-dose aspirin responsiveness is heritable and whether it is associated with specific variations in candidate genes or defined haplotypes; 50 percent of the participants are black.

Although great progress has been achieved in reducing CVD morbidity and mortality in the United States over the past 40 years, minorities have not shared fully in

the progress and continue to have higher CVD morbidity. To address this problem, the Institute has initiated programs directed at reducing cardiovascular health disparities:

- Partnership Programs To Reduce Cardiovascular Disparities (see Chapter 9): To expand the capacity of research institutions to reduce health disparities, encourage more researchers to focus on minority health, and improve minority acceptance and community willingness to participate in research by pairing research-intensive medical centers that have a track record of NIH-supported research and patient care with minority health care serving institutions that lack a strong research program and are the primary source for care of minorities. Researchers are examining the complex biological, behavioral, and societal factors that result in cardiovascular health disparities in their target populations (e.g., blacks, Hispanics, Native Hawaiians, Pacific Islanders).
- Cultural Competencies and Health Disparities Academic Award Program: To enhance the ability of physicians and other health care professionals to address, in a culturally sensitive manner, disparities in the occurrence, management, and outcomes of cardiovascular, lung, and blood diseases and sleep disorders among various population groups in the United States. The award addresses ethnic, cultural, religious, socioeconomic, linguistic, and other factors that contribute to health disparities and seeks culturally competent approaches to mitigating them.
- Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives: To test the effectiveness of culturally appropriate behavioral interventions that promote adoption of healthy lifestyles (healthy diet, regular physical activity, smoking cessation, and stress management) related to heart disease and stroke risk in American Indians and Alaska Natives.

Education

The NHLBI, through the DARD, seeks to translate research findings into practice by communicating research advances effectively and disseminating health information to physicians, health care professionals, patients, and the public on ways to prevent or treat diseases within the Institute's mandate. The Division has developed the following community-based programs to combat cardiovascular health disparities among five major cultural/ethnic groups: blacks, Hispanics, American Indians and Alaska Natives, Asian Americans, and Native Hawaiians and other Pacific Islanders:

- Public Health in Public Housing Community Outreach: Improving Health, Changing Lives: To disseminate information about improving cardiovascular health by adopting heart healthy lifestyles to populations residing in public housing.
- NHLBI-Health Resources and Services Administration Bureau of Primary Care Partnership: To integrate clinical care management teams and trained community health educators to implement pilot programs for blacks, Latinos, Asian Americans, and Native Hawaiians and other Pacific Islanders who are at high risk for CVD.
- Salud para su Corazón: To disseminate information on CVD prevention, intervention, and treatment and promote heart healthy behaviors in Hispanic communities through lay health educators (promotores model).
- NHLBI-Pan American Health Organization/WHO Partnership To Promote Cardiovascular Health in the Americas: To develop and evaluate community-based interventions to prevent and control CVD risk factors among low-resource communities in Argentina, Chile, and Guatemala using lay health workers (promotores de salud). Research results will be shared with country health authorities and the members of the CARMEN Network: an Initiative for Integrated Prevention of Noncommunicable Diseases in the Americas.
- Honoring the Gift of Heart Health: To develop and evaluate community-based interventions to prevent and control CVD risk factors through education and outreach using tribal community health workers and community health educators.
- Healthy Heart, Healthy Family: To develop and evaluate culturally and linguistically appropriate outreach activities and information to increase community awareness of heart disease and its associated risk factors and to promote heart healthy lifestyles among the growing Filipino American population.
- The Heart Truth Campaign: To raise awareness of heart disease in women through community-based interventions. Campaign goals include outreach to women of color through educational materials addressed to special populations and partnerships with national African American and Hispanic organizations.

- Stay in Circulation: Take Steps to Learn About P.A.D.: To increase public and health care provider awareness of P.A.D. and its association with other CVD. The NHLBI has developed and disseminated information through partnerships with faith-based organizations and media outlets. Special attention is directed to minority and Hispanic populations.

In addition to the activities mentioned above, the Institute has prepared publications on CVD prevention for minority populations. They include the following:

- *On the Move to Better Heart Health for African American*s
- Y*our Heart is Golden: Heart Health Promotion Activities for Vietnamese Communities*
- *Healthy Homes, Healthy Hearts Series.* Six easy-to-read English and Spanish booklets on heart healthy living.
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*
- *Your Heart, Your Life: A Health Educator's Manual for the Latino Community*
- *Vietnamese Aspire for Healthy Hearts* in Vietnamese and English
- *Honoring the Gift of Heart Health: A Heart Health Educational Manual* for American Indians and Alaska Natives
- *With Every Heartbeat is Life: A Community Health Worker's Manual for African Americans*
- *The Heart Truth for African American Women: An Action Plan*
- *Su Corazón, Su Vida:* A Community Health Worker's Manual for Latinos
- *The Heart Truth for Latinas: An Action Plan*
- *Healthy Heart, Healthy Family: A Community Health Worker's Manual for the Filipino Community* in English and Tagalog
- *Facts About Peripheral Arterial Disease (P.A.D.) for African Americans*
- *Información acerca de la enfermedad arterial periférica (P.A.D.)*

The educational materials listed throughout this chapter can be obtained from the NHLBI public Web site or through the NHLBI online catalog.

Arrhythmias

The NHLBI is supporting basic and genetic research on the mechanisms that underlie cardiac arrhythmias to improve diagnosis, treatment, and prevention of arrhythmias in all ethnic and racial groups in the United States.

Prolongation of electrocardiographic QT interval is a risk factor for sudden cardiac and individuals with diabetes are known to have increased risk for prolongation of electrocardiographic QT interval. In one study replicating the association of two common genetic variants with prolonged QT interval in a population predominately of individuals (624 European Americans and 127 blacks) with type 2 diabetes, researchers found strong association in the European American sample, but no association in the limited number of blacks. Testing in large numbers of blacks will be required to confirm this result.

Another study identified two mutations in a gene encoding the major intracellular calcium release channel in two cases of sudden infant death syndrome (SIDS). One mutation was identified in 1 out of 50 (2%) black infants and the other in 1 out of 83 (1.2%) white infants. Researchers report a pathogenic mechanism for SIDS, whereby SIDS-linked mutant ion channels become "leaky" during stress and thus potentially trigger fatal cardiac arrhythmias. They have importantly added further evidence that cardiac arrhythmias of genetic origin contribute to SIDS, a concept that offers a chance to prevent some avoidable tragedies.

A third study identified an association between variations in certain receptors that are activated during sympathetic nervous system stimulation and an increased risk of sudden cardiac death, most often due to ventricular arrhythmia. Although no significant differences were found between blacks and whites in associated risk of sudden cardiac death, continued research in this area is expected to advance understanding of differences in genetic predisposition for cardiac arrhythmias among ethnic and racial groups and ultimately lead to improved therapy.

Heart Failure

Heart failure (heart muscle dysfunction) affects about 5 million Americans of all ethnicities and is a growing public health concern. It is frequently the end result of other conditions, such as hypertension, diabetes, and prior heart attacks.

The NHLBI is supporting basic and clinical research associated with heart failure that will benefit Americans of all ethnicities. One project focuses on Native Hawaiians and the other has a minority component:

- Heart Failure Disparities in Native Hawaiians: To characterize ethnic differences in patients hospitalized for heart failure, determine whether a culturally competent educational program can reduce hospitalizations, and compare the effectiveness of early diagnosis in high-risk patients by using community-based portable echocardiography to hospital-based echocardiography performed by professional sonographers. The project is within the Partnership Programs To Reduce Cardiovascular Disparities Initiative (see page 132).
- Heart Failure Clinical Research Network (see Chapter 9): To develop, coordinate, and conduct multiple collaborative proof-of-concept clinical protocols to improve heart failure outcomes. The Network has been expanded to include a historically black medical center with minority investigators and access to a high-risk, underserved population.

Other research targeting minority populations includes an investigation of genetic variations (especially those common in blacks) that affect individual responses to the beta blocker drugs used to treat heart failure and identification of underlying genetic variations that result in familial dilated cardiomyopathy, an inherited form of heart dysfunction; five black families are participating. Another study is focusing on angioedema or severe allergic reaction, a life-threatening side effect of ACE-inhibitor drugs that is more common in blacks than in whites. Investigators are determining the mechanisms that cause the side effect and studying the genetic profile of affected individuals and their families to determine who should avoid taking the drugs.

High Blood Pressure

Etiology and Pathophysiology

High blood pressure is a serious health problem that is especially prevalent and severe among minorities. An Institute-initiated study is seeking to determine the etiology and pathophysiology of high blood pressure:

- Family Blood Pressure Program (see Chapter 9): To use a network of investigators to identify genes associated with high blood pressure and to examine interactions between genetic and environmental determinants of hypertension in specific minority populations: Asians, blacks, and Mexican Americans.

The NHLBI supports a number of investigator-initiated studies to identify genes linked to hypertension in blacks, Mexican Americans, and whites to determine if part of the disparity in prevalence can be attributed to genetic differences among the groups. Genes under investigation include those associated with the renin-angiotensin system, the autonomic nervous system, and sodium transport.

The Institute supports a number of projects to examine antecedents of hypertension in children to determine racial differences in blood pressure regulation. One study is determining relationships between cardiovascular reactivity in adolescent normotensive blacks and development of pathobiologic markers of hypertension risk (i.e., increased resting blood pressure, left ventricular mass, and relative wall thickness) later in life. Another is investigating the genetics of cardiovascular reactivity following stress in black youth.

Researchers also are examining the influence of SES and ethnic discrimination on stress reactivity to determine if it provides a pathophysiologic link to CVD in blacks. One group is examining the combined influence of low SES and ethnicity on development of behavioral risk factors (i.e., hostility, anxiety, heightened cardiovascular reactivity to stress) in a group of adolescents; 50 percent of them are black. Another group is assessing the relationship between early life exposure to socioeconomic stressors—such as adverse socioeconomic conditions, low levels of social integration, and racial discrimination—and development of hypertension in blacks.

Investigators have observed that blacks have an exaggerated blood pressure response to salt. A study to improve understanding of the biological basis of salt-sensitive hypertension in blacks has located a molecule that transports sodium in a specific region of the kidney where sodium is reabsorbed to a greater extent in blacks than in whites.

Impaired sodium regulation also appears to be linked to the development of hypertension. In a twin study consisting of 41 percent blacks, scientists are investigating sodium retention as a mechanism augmenting systemic

vascular resistance and changes in vascular function, ventricular structure, and blood pressure. In another study, scientists are investigating the effects of stress on salt retention and measuring hormonal variables known to influence sodium regulation.

A third study is seeking to determine whether the mechanisms regulating sodium retention differ between blacks and whites. Researchers found that black youths have a slower salt excretion rate in response to stress than white youths. New data suggest that obesity may contribute to the racial differences in response to stress. A study among blacks living in three different environments (Nigeria, Jamaica, and Chicago) is examining the role of sodium and obesity in hypertension development.

The role of dietary factors, particularly macronutrients, in the etiology of high blood pressure is another area of investigation. Scientists are conducting epidemiologic studies among participants with diverse ethnicity, SES, and dietary habits in four countries to determine the effect of selected dietary components (proteins, lipids, carbohydrates, amino acids, calcium, magnesium, sodium, potassium, antioxidants, fiber, caffeine) on blood pressure. Another study is seeking to identify the link between healthy diet, genetic factors, and their underlying biological mechanisms.

Treatment and Prevention

Identifying effective treatment strategies for various populations requires large-scale studies in representative populations with sufficient numbers.

- Ancillary Pharmacogenetic Studies in Heart, Lung, and Blood Diseases and Sleep Disorders: To conduct pharmacogenetic studies in ongoing or completed clinical trials/studies related to heart, lung, and blood diseases and sleep disorders to examine genetic influences on inter-individual differences in prescription drug response. Understanding the genetic influences may permit improved medication choice and dosing for individuals and help avoid either serious adverse response or poor response to therapy. Three of the studies focus on antihypertensive drugs and include 50 to 58 percent blacks.

An investigator-initiated ancillary study to ALLHAT, the largest hypertension clinical trial conducted by the NHLBI, is evaluating the pharmacogenetic response to antihypertensive treatment and long-term clinical complications in blacks, whites, and Hispanics. Scientists are seeking to determine whether pharmacogenetics is a feasible approach to personalized therapy for hypertension.

Although it is well known that reducing hypertension will reduce CVD rates, the implementation of evidence-based guidelines for hypertension treatment in clinical practice is disappointing. To address this issue, the NHLBI initiated a program to improve hypertension control rates in blacks, a group with the highest prevalence and earliest onset of hypertension and with disparately high premature cardiovascular mortality and morbidity:

- Interventions To Improve Hypertension Control Rates in African Americans: To evaluate the feasibility of clinical interventions directed at the medical care delivery system to increase the proportion of blacks who have their blood pressure controlled to levels specified by the JNC VII guidelines. Nearly 3,900 black patients are being enrolled in community-based projects to evaluate interventions such as pharmacy- and visiting nurses association-based approaches, telemanagement, and patient and physician education.

The Institute also supports a number of investigator-initiated studies to prevent hypertension and improve blood pressure control in ethnic and racial minorities. Interventions target both lay and medical communities. Strategies being tested include communication skill enhancement, organizational change, educational programs, lifestyle and nutritional counseling, use of technology, case management, pharmacy-based interventions, and provision of care by community health workers and other nontraditional providers.

Anger and hostility have been shown to be risk factors for hypertension. Scientists are evaluating an anger management intervention in a hospital setting to determine whether it will reduce blood pressure and alleviate psychosocial risk factors (e.g., reduce depression); 46 percent of the participants are black.

Understanding racial differences in blood pressure control is an area of major interest for the Institute. Scientists are examining whether variations in genes of the renin-angiotensin-aldosterone system predict differences in blood pressure response to diuretic therapy among hypertensive blacks and whites. Research also is being focused on variations in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

Education

The NHLBI has developed a number of outreach activities to inform minority populations of the importance of blood pressure control. Included among them are a toll-free number that provides materials on hypertension in English or Spanish; mini telenovelas (Más vale prevenir que lamentar), "health moments" to reinforce CVD prevention for local Spanish-language television stations; a Spanish version of the High Blood Pressure Education Month Kit; and several publications and Web-based products for health professionals, patients, and the public. Some examples are:

- *Plan de Alimentación Saludable Contra la Hipertensión: Prevenir y Controlar la Presión Arterial Alta Siguiendo el Plan de Alimentación Conocida Como DASH* (DASH to the Diet: Prevent and Control High Blood Pressure Following the DASH Eating Plan)
- *Presión arterial alta:* NHLBI Diseases and Conditions Index
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta: Lo Que Usted Debe Saber Sobre la Prevention y Control de la Presión Arterial Alta* (Prevent and Control High Blood Pressure: What You Should Know)
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta. Lo Que los Médicos Deben Saber* (Prevent and Control High Blood Pressure. What Every Physician Should Know)
- *Keep the Beat: Control Your High Blood Pressure* in English and Spanish
- *Churches as an Avenue to High Blood Pressure Control*
- *Working With Religious Congregations: A Guide for Health Professionals*
- *Help Your Heart: Control Your High Blood Pressure* in Tagalog and English
- *Keep Your Heart in Check—Know Your Blood Pressure Number* in Vietnamese and English
- *Prevent and Control High Blood Pressure: Mission Possible.*

NHBPEP Coordinating Committee Activities

Member organizations of the NHBPEP coordinating committee have continuing education programs on the prevention and treatment of hypertension that are focused on their minority members. They are also involved with outside activities that include designing public health interventions to address excessive stroke mortality in the Southeastern United States; publishing reports about best treatment practices to control hypertension; conducting demonstration projects at the work site and in urban and rural settings; developing reports and intervention programs regarding hypertension among special populations or situations (e.g., blacks, patients who are hypertensive and have renal disease or diabetes, children, older Americans); and promoting population strategies for the primary prevention of hypertension.

High Serum Cholesterol

Etiology

The Institute supports a number of investigator-initiated projects to identify genes that influence the lipoprotein profile within various racial and ethnic groups. Research findings could offer an explanation for differences in susceptibility to CHD found among various racial and ethnic groups.

Variation in hepatic lipase activity is associated with differences in plasma concentrations of HDL and LDL synthesis and catabolism. Researchers are investigating whether ethnic differences in hepatic lipase activity are responsible for the well-known differences in plasma HDL concentrations found in blacks and whites. Genetic studies are being conducted on a population that is 39 percent black.

Prevention

The NHLBI is supporting an investigator-initiated study among minority preschool children to track the long-term effectiveness of nutrition interventions on diet and blood cholesterol levels. Additional potential risk factors such as increased blood pressure, obesity, and intention to smoke, will also be monitored.

Education

The Institute has prepared the following publications on blood cholesterol for minority audiences:

- *Do You Know Your Cholesterol Levels?* in English and Spanish
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*

- *American Indian and Alaska Native People: Treat Your Heart to a Healthy Celebration!*
- *Be Heart Smart: Keep Your Cholesterol in Check* in Tagalog and English
- *Serve Up a Healthy Life—Give the Gift of Good Nutrition* in Vietnamese and English.

Obesity

Etiology

Recent NHANES data show a continued rise in the proportion of Americans who are overweight; black women are especially at risk. Results from the NHLBI Growth and Health Study (NGHS) that examined the development of obesity and CVD risk factors in a biracial cohort of young girls found black girls consumed more calories and a higher percentage of calories from fat and watched more television than white girls. An investigator-initiated study using the NGHS cohort, starting at ages 18 to 19 years, is examining the changes in cardiac output and total peripheral resistance, which occur with developing obesity, and their influence on ethnic difference in blood pressure regulation. Another project, using data from the NGHS, is examining CHD risk factors in black and white girls to identify genes involved in black–white differences in lipid metabolism and obesity.

Black women have been shown to manifest lower resting energy expenditure than white women. Scientists seeking to improve our understanding of ethnicity, genetics, energy metabolism, and obesity development are examining the relationship between two genes implicated in energy metabolism and resting energy expenditure in high-risk blacks.

Menopause-related coronary risk was previously believed to be associated with a gain in total body fat. Research, however, suggests that the location of the fat, not the total fat per se, is the key risk factor. An investigator-initiated study is seeking to determine if indices of central adiposity, particularly intra-abdominal fat, predict coronary events better than indices of total fat. The study is also examining the role of central adiposity with altered glucose and lipid metabolism and elevated blood pressure; 48 percent of the participants are black.

Treatment and Prevention

The NHLBI has initiated programs to test approaches for treating or preventing obesity.

- Overweight and Obesity Control at Worksites: To test innovative interventions that emphasize environmental approaches or the combination of environmental and individual approaches at worksites to prevent or treat obesity in adults. Environmental strategies include programs, policies, or organizational practices (e.g., increasing the availability of, and providing access to, healthful food choices and facilities for physical activity, and creating a socially supportive climate to influence healthy behaviors). Targeted groups for some projects include individuals from underrepresented racial and ethnic groups.
- POUNDS LOST (see Chapter 9): To evaluate the effectiveness of four diets differing in macronutrient composition to promote and sustain weight loss in overweight and obese individuals; 17 percent of the participants are from minority populations.
- WLM (see Chapter 9): To determine the effectiveness of continuous patient contact on weight loss maintenance in adults who recently lost weight; 40 percent of the patients are black.
- POWER (see Chapter 11): To test the effectiveness of interventions delivered in routine clinical practice on achieving weight loss in obese patients who have other CVD risk factors (e.g., hypertension). One study focuses on a low-income minority population.

The Institute supports a number of investigator-initiated studies on the effectiveness of obesity prevention and control interventions among diverse populations. One study is testing the effectiveness of weight-control interventions (involving diet, physical activity, psychosocial and familial influences) administered during the critical transition period from prepuberty to puberty in black girls at high risk for obesity. Another study in preadolescent black girls is evaluating the efficacy of an after-school dance program and a family-based intervention involving reduced use of television, videotapes, and video games to reduce weight gain.

Two studies are evaluating the effectiveness of weight control programs to prevent weight gain in a predominately black population that has recently completed a smoking cessation program. The blood pressure status of

the participants, who are prehypertensive or hypertensive at the beginning of the studies, are being monitored.

Blacks at high risk of CVD often have limited success in weight loss and lifestyle change programs. A study was initiated to examine the role of social support, particularly from family members and friends, to facilitate weight loss and related dietary and physical activity changes in blacks.

Hispanics are also an important population targeted for intervention programs. One project is studying the effects of physical activity and dietary behaviors in a microenvironment (i.e., home environment) and in a macroenvironment (i.e., apartment complex, schools, grocery stores, parks, restaurants). Community health workers (promotoras) are working with the families and the community to increase awareness and promote environmental change. Another project with strong Hispanic participation is evaluating how well an intervention, Planned Care for Obesity and Risk Reduction, supports primary care treatment of obesity in adults with at least one other cardiovascular risk factor. The study is seeking to improve the way primary care providers offer services to their patients who are overweight and who also have other important medical conditions or health risks such as hypertension, smoking, or high cholesterol.

A project with a subject population consisting of Asians, Hispanics, and whites is testing an integrated school- and community-based intervention involving physical activity and diet to reduce the prevalence of obesity.

In a study among Hispanic adolescents, researchers are developing new instrumentation for evaluating the effects of overweight or obesity on adverse metabolic effects (such as insulin resistance) or autonomic nervous system disturbances (such as sleep disordered breathing), which may precede diabetes or hypertension.

Obesity is one of the major health challenges facing Native American children and has serious implications for the development of type 2 diabetes. A school-based intervention, augmented with a family intervention, is focusing on reducing excess weight gain by increasing physical activity and healthy dietary practices in kindergarten and first-grade Native American children.

Education

The NHLBI has prepared health information on losing excess weight for minorities:

- *Do You Need To Lose Weight?* in English and Spanish
- *Embrace Your Health! Lose Weight if You Are Overweight.*
- *Keep the Beat: Aim for a Healthy Weight* in Tagalog and English
- *We Can!*™ (Ways to Enhance Children's Activity & Nutrition): Many bilingual (English and Spanish) publications on energy balance are available on the Web site.

Physical Inactivity

Physical inactivity among children is often attributed to the lack of open space, lack of recreational equipment, and fear by parents for the safety of children playing outdoors. A study is being conducted to determine if an intervention that changes these neighborhood features in a low-income, inner-city neighborhood will increase physical activity in children.

Scientists have observed an age-related decline in aerobic capacity, but have not been able to discern the effects of physical activity, body fat, and genetic variation on its rate of change. They also have little understanding about how the rate of change in aerobic capacity during early and middle adulthood affects the development of CVD. An ancillary, investigator-initiated study being conducted in conjunction with the Year 20 CARDIA examination is addressing these issues. Data from this study should increase understanding of the interrelationships of cardiorespiratory fitness, body composition, and CVD-related risk factors and endpoints, and may provide the basis for more extensive evidence-based recommendations on the role of fitness in cardiovascular health; 45 percent of the participants are black.

A project in the field of bioengineering and obesity is seeking to develop better measurement techniques for assessing levels of activity and the impact of inactivity on overweight and obese children. Carried out in an approximately 50 percent black population, this project is developing and testing devices that can precisely measure activity levels in highly sedentary overweight or obese adolescents.

Education

The Institute has prepared the following publications for minorities on the importance of physical activity and ways to become more physically active:

- *Energize Yourself! Stay Physically Active*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta con Actividad Física* (Move To Prevent and Control High Blood Pressure With Physical Activity)
- *American Indian and Alaska Native People: Be Active for Your Heart!*
- *Are You at Risk for Heart Disease?* in Tagalog and English
- *Be Active for a Healthier Heart* in Vietnamese and English.

The Institute also has developed a Web-based application on physical activity for lay health educators in English and Spanish, which can be found at http://hin.nhlbi.nih.gov/salud/pa/index.htm.

Smoking

Smoking is a major risk factor for CHD and stroke and is the leading cause of preventable death. Although great progress has been made in smoking cessation programs, maintenance of behavior change has been limited. To address this problem, the Institute is supporting several investigator-initiated smoking intervention and follow-up cessation maintenance studies. One study targets low-income, high-risk women from a variety of ethnic and racial backgrounds who have quit smoking because of their pregnancy. It is comparing the biochemically confirmed smoking abstinence rates of women who quit smoking during their pregnancy and who receive intervention-based telephone counseling with the rates of quitters who receive usual care. Maintenance of abstinence will be assessed at 1, 3, 6, and 12 months postpartum.

Another study targets respiratory therapists and nurses who provide hospital-based tobacco cessation interventions to parents of hospitalized pediatric patients with respiratory illness. It focuses on refining an interactive Internet-based program, WeBREATHe (Web-Based Respiratory Education About Tobacco and Health); evaluating the program for use in children's hospital settings in a randomized trial of respiratory therapists and nurses assigned to either the Training Condition (WeBREATHe program) or a Delay Training Control condition; and developing a final version of the interactive training program with manuals. Forty-two percent of the participants are expected to come from minority populations.

Obesity and smoking are risk factors for hypertension. Typically, smokers who succeed in quitting tend to gain excess weight, which may exacerbate existing hypertension. Intervention programs for smokers who are hypertensive need to include a weight loss component. Two studies in smokers with hypertension will compare the effectiveness of a pharmacologic smoking cessation intervention followed by a weight gain prevention and blood pressure control program consisting of changes in dietary intake and physical activity to the same smoking cessation intervention followed by general health education. At a 1-year follow-up session, researchers will compare the changes in blood pressure, body weight, dietary intake, physical activity, hypertensive status, and medication status between the two groups. Sixty percent of the participants are expected to be black.

Smoking prevalence among active duty military personnel is high, especially among young recruits and those in the Marines where the rate is almost 40 percent. Because of the unique challenges such as high troop mobility, remote locations, and limited access to health care services, many interventions that have shown strong efficacy in civilian populations often fail in military populations. One program, Tobacco Quit Lines, is a promising and widely disseminated approach that can address many of the issues, such as troop mobility and remote access, associated with the military. An investigator-initiated study is seeking to determine the long-term (1-year) efficacy of an interventionist versus a Reactive Quit Line intervention; 28 percent of the population is expected to come from minority populations.

Smoking rates among the homeless population are extremely high, with estimates of 70 percent or more. Two of the three major causes of death among the homeless are heart disease and cancer, both of which are tobacco related. Recent studies have shown that many homeless smokers are ready to quit smoking. Maintenance of smoking cessation, however, is rather low. The Institute is supporting a study to compare smoking abstinence at 6 months among homeless participants who received nicotine patches for 8 weeks: the intervention group received five counseling sessions

encouraging adherence, and the control group received advice to quit in one brief session.

The estimated prevalence of smoking among individuals with HIV is approximately 50 percent. As they age, they are at an increased risk of smoking-related lung damage. Investigators are developing and evaluating a specialized smoking cessation intervention for nicotine-dependent HIV smokers. The study also will examine the effects of smoking cessation on the course of lung function decline, prevalence of respiratory symptoms, and occurrence or progression of emphysema in a cohort of HIV individuals; 38 percent of the participants are expected to be black.

Education

The Institute has prepared the following publications on smoking cessation for minorities:

- *Enjoy Living Smoke Free* in English and Spanish
- *Refresh Yourself! Stop Smoking*
- *American Indian and Alaska Native People: Help Your Heart*
- *Be Heart Healthy: Enjoy Living Smoke Free* in Tagalog and English
- *Don't Burn Your Life Away—Be Good to Your Heart* in Tagalog and English and in Vietnamese and English.

Psychosocial Factors

Major depression is a risk factor in the development of ischemic heart disease and for death after an acute MI. Investigator-initiated research is seeking to determine the pathways that link depression to physiological mechanisms in patients who are post-MI. One study is examining the link between the severity of depressive symptoms to the inflammatory process implicated in atherogenesis by focusing on the basal expression of cytokines and cell adhesion molecules on blood monocytes. Another study is focused on the autonomic nervous system and its link to depression. A third study is investigating the role of platelets, platelet aggregation, and adhesion in patients with major depression. Approximately 30 percent of the participants in the studies are black.

The NHLBI is interested in the effect of depression, anxiety, and lack of social support on prognosis after a CHD event. An investigator-initiated study is examining the efficacy of individual and group therapy in patients who are post-MI and socially isolated or clinically depressed. Scientists will be measuring biological risk factors (e.g., lipids, adiposity, coagulation factors) and possible subclinical markers of disease (e.g., carotid intimal-medial thickness, coronary calcification); 34 percent of the participants are black.

The Institute supports investigator-initiated research on the role of race and ethnicity, psychosocial and environmental factors, and low SES in the development of CHD. Scientists are investigating the contribution of biobehavioral factors (hostility, anxiety, and heightened cardiovascular reactivity to stress) in the etiology, pathogenesis, and course of CHD. Racial differences in stress-induced physiologic responses also are being examined. Other investigators are focused on the relationships of psychosocial stress, sleep disordered breathing, and nocturnal physiological measures with emerging risk factors and subclinical CVD; 50 percent of the participants are black.

Although psychosocial risk factors such as depression, hostility, and stress have been associated with CVD, their role in stroke incidence and mortality has not been determined. An investigator-initiated study is seeking to determine whether psychosocial risk factors (depression, stress, hostility, perceived discrimination) or living in stressful neighborhoods are associated with increased risk of incident stroke and stroke mortality in a biracial population. Scientists will also compare the risk of stroke in blacks and whites and examine the degree to which racial differences in stroke risk are mediated by psychosocial risk factors.

Investigators are interested in the effects of race and psychosocial factors, such as hostility, on glucose metabolism. A study was initiated to determine how hostility is differentially related to glucose metabolism in blacks and whites. Research findings may increase understanding of the differences in the etiology of diabetes in the two groups.

Additional areas of interest include the genetic basis of aggression and the relationships between risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity), presumed mediating variables (sympathetic nervous system activity and insulin metabolism), and CHD risk factors; 50 to 60 percent of the participants are black or Hispanic.

Diabetes

Diabetes mellitus is a strong risk factor for CVD. Its prevalence is increasing due to the significant increase of obesity and physical inactivity in the population, especially among blacks, Hispanics, and American Indians. To address this growing problem, the Institute is supporting an investigator-initiated study on defining the relationship between the overall dose of endurance exercise training and the corresponding response of metabolic risk factors in an overweight and obese biracial female population. Another study will determine if adolescents with type 2 diabetes have a high risk of developing clinical CVD in their late 20s or 30s. Scientists are using noninvasive imaging techniques for detecting subclinical atherosclerosis to measure CVD development in a predominantly black population.

Hypertension and diabetes are major contributors to CVD and occur disproportionately in blacks. In particular, black women seem to have earlier disease onset and poorer outcomes. Scientists are investigating the link between hypertension and type 2 diabetes and the relative excess of androgen found in black women to determine whether insulin resistance, excess androgen, and endothelial dysfunction contribute to accelerated vascular injury in blacks.

Treatment

The NHLBI supports clinical trials to determine the benefits of various strategies to reduce CVD among patients with diabetes or treat patients with coronary artery disease and diabetes.

- ACCORD (see Chapter 11): To evaluate the benefits of different therapies to reduce CVD in type 2 diabetes; more than 33 percent of the participants are minorities.
- BARI 2D (see Chapter 9): To evaluate whether urgent revascularization offers an advantage over medical therapy in patients with coronary artery disease and diabetes. In addition, for a given level of glycemic control, to determine whether insulin-providing drugs offer advantages or risks compared to insulin sensitizers (drugs that enhance insulin action); 33 percent of the participants are from minority populations.
- SANDS (see Chapter 9): To compare intensive treatment (pharmacologic agents, such as ACE inhibitors and simvastatin for high blood pressure and LDL cholesterol) to conventional treatment in 549 American Indians, aged 40 years or older, with diabetes. The primary endpoint is a combination of measures of carotid intimal-medial thickness and cardiovascular events such as heart attacks or strokes.

An investigator-initiated study is evaluating the effectiveness of a multiple risk factor intervention (diet, exercise, stress management, social support, smoking cessation) targeting postmenopausal Hispanic women with type 2 diabetes.

Education

The Institute has prepared the following publications on diabetes for minorities:

- *Protect Your Heart Against Diabetes* in English and Spanish.
- *Protect Your Heart: Prevent and Control Diabetes* in Tagalog and English

Women's Health Initiative

CHD, cancer, and osteoporosis are the most common causes of death, disability, and impaired quality of life in postmenopausal women. The WHI (see Chapter 11) is addressing the benefits and risks of hormone therapy, changes in dietary patterns, and calcium/vitamin D supplements in disease prevention. Several of the centers have recruited primarily minority populations: American Indians, Asians, blacks, Hispanics, and Pacific Islanders. The clinical trial recruited 12,607 minorities and the observational study recruited 15,658. Overall, of the 161,808 postmenopausal women recruited into the WHI, 17 percent were minorities.

The Institute awarded 12 new contracts in 2007 to help explain the postmenopausal hormone therapy and other clinical trial findings and to investigate the effects of genetic and biological markers on common diseases affecting postmenopausal women. Investigators will conduct their research using blood, DNA, and other biological samples and clinical data from WHI participants. Four contracts focus specifically on minority women:

- Physical Activity, Obesity, Inflammation, and CHD in a Multi-Ethnic Cohort of Women: To clarify the mechanisms underlying the reduced risk of CHD conferred by physical activity and lower body fat, beyond their effects on traditional risk factors.

Using data from the WHI observational study, researchers will examine the association of physical activity and inflammatory markers and determine whether the association varies by a person's weight; and investigate the association between physical activity combined with weight/obesity status and risk of CHD. They will compare the role of inflammatory markers in mediating the associations of physical activity combined with weight with CHD risk to the role of traditional risk factors, such as blood pressure and cholesterol levels.

- Ancestry Association Analyses of WHI Traits: To determine the contribution of ancestry informative markers in DNA samples to differences in risk of CHD, stroke, breast cancer, and hip fractures in blacks and Hispanics and analyze genetic factors related to ancestry or country of origin affecting hip fracture and bone mineral density in whites and blacks.
- Biochemical Antecedents of Fracture in Minority Women: To examine biochemical factors for fracture in minority and white women. Research results could explain differences in fracture rates and contribute to prevention strategies.
- Interaction Effects of Genes in the Inflammatory Pathway and Dietary Supplement and Medication Exposures on General Cancer Risk: To identify genetic variants in genes involved in inflammation and immunity that are associated with cancer risk (breast, colon and rectum, and lung) in whites and blacks. Scientists will test associations between the use of dietary supplements and nonsteroidal anti-inflammatory drugs (NSAID) with inflammatory markers and risk of overall cancer. They will then study interaction effects of genetic variants with dietary supplement and NSAID exposure on cancer risk.

Lung Diseases

The NHLBI supports research on a number of lung diseases, such as asthma, COPD, sarcoidosis, TB, and HIV-related lung diseases, which disproportionately affect minorities. The following section provides examples of research to address health disparities in lung diseases; selected sleep disorders are also included.

Asthma

Asthma is a chronic lung disease that inflames and narrows the airways. It affects people of all ages, but it most often starts in childhood. In the United States, more than 22 million people are known to have asthma and nearly 6 million are children.

Etiology and Pathophysiology

The NHLBI has initiated several studies to determine the etiology and pathophysiology of asthma.

- Severe Asthma Research Program: To determine the mechanistic basis for severe asthma and to determine how it differs from mild-to-moderate asthma. Several of the projects have strong minority participation.
- Asthma Exacerbation: Biology and Disease Progression: To elucidate the biologic mechanisms of asthma exacerbation pathobiology and resolution and to determine their effect on lung function, physiology, and disease state; 27 to 56 percent of the study participants will come from various minority populations.
- Genome-Wide Association Studies to Identify Genetic Components Related to Heart, Lung, and Blood Disorders: To identify genetic variants related to heart, lung, and blood disorders and their risk factors using existing population, family, and clinical studies. Several of the asthma-related projects have strong minority representation in the study populations.

The Institute also supports investigator-initiated projects on the etiology and pathophysiology of asthma. They include a study to identify positional gene candidates for airway hyperresponsiveness and compare their association with asthma between two asthmatic groups: a white population on Tangier Island, VA, and a black population from Barbados; a study to establish the link between specific genotypic variants and phenotypic markers, and to elucidate the immunological pathways that contribute to asthma severity in blacks; and a case-controlled study to identify genetic determinants of asthma risk among populations of African ancestry by performing genome-wide association studies and gene–gene and gene–environment interaction studies.

Latinos carry a disproportionate burden of asthma. Yet few investigators studying the genetics of asthma have focused on them, partly due to the complexity of the Latino gene pool. One study, however, is developing and testing new methods to correct for population stratification due to racial admixture, a key problem

confounding genetic studies in the Latino population. The project focuses on data from the NHLBI-supported Genetics of Asthma in Latino Americans to assess population stratification.

Other projects that focus on Hispanic populations include one that uses genomic screening to search for the genetic basis of asthma in a homogeneous Hispanic population in Costa Rica and another that involves a population-based case control association study to examine the influence of genetic and environmental factors on the development and severity of asthma in Puerto Rican children.

Occupational and environmental factors are known to trigger asthma symptoms. An investigator-initiated study is focusing on understanding the mechanisms by which occupational or environmental factors trigger the onset of asthma among low-income, urban blacks and Hispanics. Another study is examining the association of early exposure to endotoxin (which appears to promote the development of the immune system), nitrogen dioxide, and aeroallergens (which trigger asthma exacerbations); obesity; physical inactivity; and environmental tobacco smoke on the prevalence, persistence, and incidence of asthma in black and Hispanic children enrolled in inner-city Head Start programs.

Circadian change in airway function is an important aspect of asthma, as more than 70 percent of deaths and 80 percent of respiratory arrests occur during sleep. Focusing on nocturnal asthma, researchers are investigating the mechanisms that cause the changes in airway function that lead to exacerbation of symptoms; minority populations comprise 36 percent of the study population.

Treatment and Control

The Institute has initiated research to identify optimal drug strategies for treatment and management of asthma. Because the burden of asthma disproportionately affects minority children, it is important for them to be well represented in clinical trials.

- ACRN-Phase II (see Chapter 11): To establish an interactive network of asthma clinical research groups to conduct studies of new therapies for asthma and disseminate findings to the practicing community. Overall, 30 percent of the participants are from minority populations.
- CARE (see Chapter 11): To establish a network of pediatric clinical care centers to determine optimal treatment and management strategies for children with asthma. The studies considered by the network will attempt to customize therapy based on specific asthma phenotypes and genotypes; minorities comprise 30 percent of the population.
- Centers for Reducing Asthma Disparities (see Chapter 9): To support partnerships between minority-serving institutions and research-intensive institutions to conduct studies on causes of and corrections for disparities in asthma among racial/ethnic and low SES populations. Reciprocal training is encouraged to ensure culturally sensitive projects and enhance research capabilities.

The Institute is also supporting investigator-initiated studies focusing on finding effective treatment for various populations. One study is examining the effect of steroids on enhanced alpha-adrenergic vascular responsiveness in asthma; 77 percent of the participants are minority. Another study is using preexisting, well-characterized cohorts of patients with asthma to identify genetic variants that can predict therapeutic response to asthma drugs. Scientists are interested in the influence of race/ethnicity on the genetic factors associated with asthma therapeutic responses.

Translational Activities

Ensuring full use of modern asthma treatment strategies is an important goal of the NHLBI. The Institute is supporting an investigator-initiated study to determine the effectiveness of an intervention that is removing barriers to preventive care to improve asthma management and lower asthma morbidity. Scientists are using a Breathmobile to deliver asthma screening to black children attending Head Start programs and a special consultation service to communicate directly with the parents about asthma management. Another study among low-income, inner-city children with asthma attending preschool is testing a bilingual intervention program to improve asthma management; 60 percent of the participants are Hispanic and 40 percent are black.

Additional studies to improve asthma management among minority groups include a study to test whether individualized interventions will improve asthma management in a black and Hispanic population. Another study seeks to improve asthma management by teaching children with asthma to recognize symptoms of the

presence of airflow obstruction; 42 percent of the participants are black and 6 percent are Hispanic.

Two randomized controlled trials are being conducted among patients recruited at the time of an emergency department visit for asthma exacerbation. One study is testing an intervention to enhance knowledge, self-efficacy, and asthma-related social support; 40 percent of the patients are minorities. The other study focuses on young black children recruited at the time of an emergency department visit for asthma exacerbation. Investigators are testing the effectiveness of an intervention strategy that includes case management, telephone contacts, and a monetary incentive to increase follow-up visits to primary care providers.

Three studies are evaluating the benefits of working with public school systems to improve adherence to asthma management. In Birmingham, Alabama, scientists are evaluating the impact of school-based supervised asthma therapy on asthma exacerbations in a predominately black population with moderate-to-severe asthma. In New York, they are testing the ability of an intervention that includes in-school intensive asthma education to 9th- and 10th-grade students who have persistent asthma and intensive asthma education for their community physicians to improve asthma morbidity; 90 percent of the participants are black. In Detroit, investigators are developing and evaluating an Internet-based self-management program for black teens with asthma.

Chronic environmental tobacco smoke exposure, particularly from parental smoking, is associated with more severe asthma, increased incidence of emergency department visits, life-threatening attacks, and prolonged time to recovery from asthma exacerbation requiring hospitalization. A study is being conducted to evaluate an intervention tailored to parental stage of change regarding smoking practice, to reduce asthma crisis care used by children with persistent asthma.

Education

The Institute has developed easy-to-read materials on asthma treatment and control directed to English and Spanish audiences with low literacy.

- *Facts About Controlling Your Asthma*
- *El Asma: Cómo Controlar Esta Enfermedad* (Facts About Controlling Your Asthma)

Chronic Obstructive Pulmonary Disease

COPD is a disease in which the lungs are damaged, making breathing difficult. It is responsible for more than 500,000 hospitalizations and 100,000 deaths in the United States each year. The Institute has established a research network to determine effective disease management approaches for individuals with moderate-to-severe COPD.

- COPD Clinical Research Network (see Chapter 11): To perform collaborative, therapeutic interventional trials of medications, devices, and disease management strategies in individuals with moderate-to-severe COPD. In addition to evaluating treatment efficacy, network studies may include examinations of genetic factors, biomarkers, or genomic/proteomic profiles that may identify patients who are more or less likely to benefit from various treatments.

The NHLBI has recently begun a large, investigator-initiated study of genetic factors that determine the risk of developing COPD or that influence the type and extent of damage done to the body by the disease. The COPDGene™ study will enroll approximately 3,500 blacks with a substantial history of cigarette smoking, obtain extensive baseline clinical and phenotypic data regarding the individuals, and compare the severity and character of COPD in the subjects to analyses of their DNA. Genomewide genetic assays will be performed on a substantial fraction of this cohort.

Although COPD is less common among blacks than among whites, it is nevertheless the seventh leading cause of death among blacks. Any disparity, whether higher or lower in the minority group, may reflect racial differences in the biology of the disease that would require use of different treatments or drugs for optimal disease management. If the genes found to be determinants of COPD risk differ in blacks and whites, this will provide clues to how the roles of specific pathogenetic pathways of COPD differ among races.

Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown etiology characterized by persistent granulomas with damage to surrounding tissue. The Institute has initiated a program to determine the immunopathogenesis of granulomatous inflammation found in sarcoidosis, including the role of predisposing factors, the immune components

involved in the formation of granulomas, and the defective regulatory immune response.

In the United States, sarcoidosis often occurs more frequently and with more severity in blacks than in whites. This may reflect the intensity of the noncaseating granuloma, the hallmark of sarcoidosis, in affected tissue. A twofold greater density of granuloma in bronchiolar lung biopsies was recently found in black patients, which correlated as a measure of disease severity.

Investigator-initiated studies on the causes of sarcoidosis include a study to identify genes linked to sarcoidosis susceptibility in blacks and to determine if hereditary susceptibility predisposes blacks to sarcoidosis, and a project to elucidate the mechanisms involved in the immunologic and inflammatory processes that ultimately lead to end-stage fibrosis in progressive pulmonary sarcoidosis; many of the participants are black.

A new project funded in FY 2008 will support mentored research to investigate selected genetic and nongenetic potential risk factors for sarcoidosis. This project will be conducted within the Black Women's Health Study.

Sleep Disorders

Sleep-disordered breathing (SDB), a condition characterized by repetitive interruption in breathing, is a common disorder that disproportionately affects blacks. It is associated with an increased risk of CVD, including hypertension and stroke, and is particularly prevalent in patients with heart failure. Ongoing programs are assessing the interrelationship between sleep disorders and heart failure and the mechanisms leading to cardiovascular stress when the two intersect.

The Institute also supports a spectrum of investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB, sleep deprivation, and shift work in various community settings. Characterization of how SDB occurs within family groups is helping to identify potential genetic risk factors that may allow early identification and treatment of high-risk individuals. A community-based study of sleep in Hispanics is assessing the prevalence and awareness of sleep disorders.

The Institute supports research related to the consequences of short sleep or sleep disturbances.

- Mechanisms Linking Short Sleep Duration and Risk of Obesity or Overweight: To examine cause-and-effect relationships and mechanisms that may explain the association between short sleep duration and increased risk of obesity or overweight due to altered metabolism, appetite, or inflammation. Minority participation ranges from 29 percent blacks to a Chinese twin cohort.
- Inter-Relationships of Sleep, Fatigue, and HIV/AIDS: To elucidate the etiology of sleep disturbances and fatigue associated with HIV/AIDS. Most of the participants are black.

Treatment and Control

The NHLBI has initiated a clinical trial to determine whether adenotonsillectomy is an effective treatment for SDB in children.

- Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea (see Chapter 9): To assess the efficacy of adenotonsillectomy as a treatment for SDB in children aged 5 to 9 years; 50 percent of the participants are from various minority and ethnic populations.

Education

The NHLBI published *Your Guide to Healthy Sleep,* which provides the latest information about sleep apnea and other sleep disorders, including insomnia, restless legs syndrome, and narcolepsy.

HIV-Related Lung Diseases

HIV infection disproportionately affects minority populations in the United States and due to multidrug antiretroviral therapy, has become a chronic condition for many patients. Among them, HIV-associated lung complications are frequent causes of illness and death. But the long-term consequences of HIV infection and HIV-associated lung infections and complications are unknown. Little is known about drug-resistant Pneumocystis, the prevalence and pathogenesis of HIV-associated COPD, HIV-associated pulmonary hypertension, and immune reconstitution syndromes. In developing countries where millions of people are HIV-infected, many have serious or fatal lung complications including TB and bacterial pneumonias that have never been well characterized.

Etiology and Pathophysiology

In addition to supporting investigator-initiated research on the etiology and pathogenesis of HIV-associated lung diseases, the Institute has initiated research to understand their causes and impact and to identify potential therapeutic targets and preventive strategies.

- The Mechanisms of HIV-Related Pulmonary Complications: To encourage innovative research on the roles of co-infections, immune factors, and genetic predisposition in the pathogenesis of HIV-related pulmonary diseases.
- Longitudinal Studies of HIV-Associated Lung Infections and Complications: To accelerate research on lung complications associated with HIV-infection by characterizing lung infections, other HIV-associated lung complications, and their consequences in longitudinal studies in existing HIV-infected cohorts and other established groups of patients who are HIV-infected. Expected minority enrollments at the U.S. sites range from approximately 40 to greater than 80 percent, depending on the center.

Tuberculosis

TB is a common and often deadly infectious disease caused by the bacteria *Mycobacterium tuberculosis*. In the United States, it is estimated that 10 to 15 million people are infected with the TB bacteria, and 22,000 new cases of TB occur each year.

Etiology and Pathogenesis

The Institute supports investigator-initiated research that includes characterizing genes associated with TB susceptibility, investigating host lung defenses, including immune responses to infection and studying the impact of TB on HIV disease.

Treatment and Control

The NHLBI supports a number of investigator-initiated studies focused on understanding the relationship between the immune system and TB. Most of the studies are being conducted among patients from minority populations. Included among them are studies to compare susceptibility to TB in populations in Mexico and Peru; examine the role of interferon-gamma in the pathogenesis of TB among Hispanics with and without HIV; identify and characterize host factors that predispose Asians to develop TB; and determine the effectiveness of adding aerosolized interferon-gamma to the usual treatment regimen for advanced TB in predominately minority populations in the United States and South Africa.

The NHLBI also supports research to improve TB control among minority populations. One project is evaluating educational strategies to improve adherence to medication regimens and regular clinic visits among Hispanic adolescents infected with TB. Another study, located in the Harlem community of New York City, is testing a new strategy to promote adherence to therapy among inner-city patients who have TB. Both programs are outgrowths of behavioral research programs begun by the Institute in 1995.

A third program, directed toward public health workers, could affect the health of minority populations, where TB rates are disproportionately high. Scientists are evaluating the effectiveness of a new TB contact priority model for investigating contacts of persons who have infectious TB. An effective model could enhance contact investigations and provide more efficient TB disease control.

Education

Building on the foundation laid by the Tuberculosis Academic Award program, the NHLBI is supporting a consortium of five TB curriculum centers:

- TB Curriculum Coordinating Center: To strengthen, expand, and increase access to the best ongoing educational and training opportunities in TB for medical, nursing, and allied health schools, especially those that provide primary care to communities where TB is endemic and the population is at high risk of developing TB.

Blood Diseases

The NHLBI supports basic and clinical research on SCD and Cooley's anemia with the goal of curing the disorders and improving patient care.

Sickle Cell Disease

Basic Research

SCD is an inherited blood disorder that produces chronic anemia, periodic episodes of pain, and end organ damage. It affects about 1 in 500 blacks and 1 in 1,000 Hispanics. Since 1972, the NHLBI has supported

an extensive research program to improve understanding of the pathophysiology of SCD, identify better approaches for its diagnosis and treatment, and prevent complications.

Basic and translational research currently focuses on genetic influences on disease manifestations, regulation of hemoglobin synthesis, discovery of drugs to increase fetal hemoglobin production, transplantation of blood-forming stem cells, gene therapy, and development of animal models for preclinical studies. The NHLBI supports this research through Institute-initiated and investigator-initiated projects.

- BTRP (see Chapter 9): To encourage fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. SCD Scholars programs for the career development of young investigators and Summer-for-Sickle-Cell-Science programs for research training and mentoring of high-school students also will be supported as part of a larger effort by the Institute to prepare the next generation of scientists to advance the field of SCD research. The BTRP was reconfigured from the NHLBI Comprehensive Sickle Cell Centers (CSCC) program.
- Pulmonary Complications of Sickle Cell Disease: To stimulate collaborative translational research on the pulmonary complications of SCD. Researchers in hematology and pulmonary science, using a combination of basic and clinical approaches, are investigating the major known pulmonary complications of SCD due to acute chest syndrome, pulmonary hypertension, and oxyhemoglobin desaturation.

Two trans-NHLBI initiatives support research in SCD:

- Genome-Wide Association Studies to Identify Genetic Components Related to Heart, Lung, and Blood Disorders (see page 142): To investigate common genes involved in subphenotypes of SCD and centenarians. Scientists seek to identify genetic associations with specific clinical features in the two populations and subsequently compare the two datasets for differences and similarities. Research results could lead to improved treatment for SCD and increase our understanding of the genetic components that enhance healthy aging.
- Ancillary Studies in Clinical Trials: To conduct time-sensitive ancillary studies in conjunction with ongoing Phase II-III clinical trials or network clinical trials related to heart, lung, and blood diseases and sleep disorders. One study seeks to identify genetic variations underlying Rh antigenic diversity in patients who have SCD. Research findings will be used to develop high throughput microchips to screen for matching donors and recipients prior to blood transfusion. Knowledge of the genetic basis for compatibility between donors and patients who have SCD for transfusion could contribute to preventing alloimmunization and improve care for patients who have SCD. Another study employs proteomic approaches to identify biomarkers of early cerebral ischemia in children who have SCD. Identifying such circulating biomarkers could allow earlier therapeutic intervention in these children.

Clinical Research

The NHLBI is committed to finding improved treatments and ultimately a cure for SCD and other hemoglobinopathies. Institute-initiated studies have begun to yield therapies that will alleviate the symptoms of sickle cell anemia and procedures that should ultimately provide a cure.

- BABY HUG (see Chapter 11): To assess the effectiveness of hydroxyurea in preventing onset of chronic organ damage in young black children who have sickle cell anemia. At baseline, the trial has demonstrated that the spleens and kidneys of 1-year-old children are already damaged.
- SWITCH (see Chapter 9): To determine whether hydroxyurea and phlebotomy can maintain an acceptable stroke recurrence rate and significantly reduce hepatic iron burden compared with transfusion plus chelation in black children who have had overt stroke.
- Sickle Cell Disease Clinical Research Network (see Chapter 11): To conduct Phase III randomized controlled clinical trials to test the efficacy and effectiveness of new therapies to treat and prevent complications of SCD and, when appropriate, thalassemia.
- Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension (see Chapter 11): To test the effects of 16 weeks of chronic sildenafil therapy on exercise endurance and pulmonary artery pressure in patients aged 14 years or older with pulmonary hypertension and SCD. The NHLBI

Intramural Vascular Medicine Branch is participating as one of the nine clinical centers in this trial.

- Clinical Trials Consortium: To complete two Phase II trials that had been initiated by the CSCC program: CHAMPS, which examines the effectiveness of hydroxyurea and magnesium pidolate alone and in combination in subjects with hemoglobin SCD, and the Neuropsych II Study, a pilot study that compares the neuropsychological outcomes of adult patients who receive chronic transfusions compared with patients who are not transfused.
- The Adult Sickle Cell Quality of Life Measurement Information System (ASCQ-Me): To develop, validate, and disseminate a sickle cell-specific quality-of-life measurement tool that is a partner with and complementary to the NIH Roadmap Patient-Reported Outcomes Measurement Information System (PROMIS). ASCQ-Me will be publicly available to researchers who plan to assess health-related quality of life in clinical trials, and studies comparing effectiveness of different therapies.

The NHLBI supports several transplant-related clinical studies that seek to reach minority populations.

- Blood and Marrow Transplant Clinical Trials Network (BMT CTN) (see Chapter 11): In collaboration with the NCI, to perform clinical trials to advance hematopoietic stem cell transplantation. To reach minority populations, the Network supports bilingual transplant center personnel and provides public Web pages and educational materials. In addition, the Network is working with the National Marrow Donor Program to develop strategies and implement procedures to enhance enrollment of patients from minority groups.

A new clinical trial of unrelated donor marrow and umbilical cord blood transplantation for severe SCD is being supported through the BMT CTN and the Sickle Cell Disease Clinical Research Network. The Sickle Cell Unrelated Transplant Trial is the first Phase II study to assess the promise of this therapy as a curative option for patients who are severely affected by SCD.

The NIH Hydroxyurea Treatment for SCD Consensus Conference, sponsored by the NIH Office of Medical Applications of Research and the NHLBI, along with other NIH and HHS components was held in February 2008. This conference assessed the available scientific evidence and concluded that hydroxyurea treatment for patients who have sickle cell anemia is underutilized and should be increased in adolescents and adults. Research has shown that patients who have SCD and are taking hydroxyurea experience fewer pain crises and hospital admissions. The conference panel advocated increased use of the drug with appropriate monitoring, and continuing follow-up of children in ongoing clinical trials.

To build capacity for clinical research, the NHLBI is funding the Clinical Hematology Research Career Development Program, which supports the early career development of clinical researchers who are expected to become independent investigators and assume academic leadership roles in nonmalignant clinical hematology.

Recommitment to Sickle Cell Disease Research

In March 2008, after a rigorous program assessment, extensive public input, and advice from the NHLBAC, the NHLBI announced a comprehensive and innovative restructuring of its research SCD program. As a result, the NHLBI is moving forward with the following innovations to its SCD portfolio:

- Basic science: Support for basic research will be expanded through funding of investigator-initiated grant applications and through NHLBI-initiated RFAs focused on the pathophysiology of SCD, the biology of pain in SCD, fetal hemoglobin switching, and genetic modifiers of disease expression and progression.
- Translational and clinical research: the Institute reconfigured the CSCC program into a BTRP with dedicated training components.
- Participation in clinical research: The scope of clinical research trials will be broadened to allow a greater number of people with SCD to participate in NIH-sponsored clinical research trials.
- Translation and dissemination to the community: In partnership with the Sickle Cell Disease Association of America and other patient advocacy groups and professional organizations, the NHLBI will develop evidence-based guidelines for the care of people with SCD across the life-span that can be used by health care practitioners throughout the world.

Education

The NHLBI has developed a number of publications on SCD that target minorities:

- *Datos Sobre La Anemia Falciforme* (Facts About Sickle Cell Anemia)
- *Fact Sheet: Hydroxyurea in Pediatric Patients With Sickle Cell Disease*
- *Facts About Sickle Cell Anemia*
- Patient Fact Sheet: *The Multicenter Study of Hydroxyurea in Sickle Cell Anemia (MSH)*
- *Management and Therapy of Sickle Cell Disease.*

Cooley's Anemia

Cooley's anemia is an inherited disorder of red blood cells that affects primarily people of African, Asiatic Indian, Chinese, Mediterranean, and Southeast Asian origin. In 2000, the Institute initiated a program to establish a network of clinical research centers to evaluate new therapeutic agents.

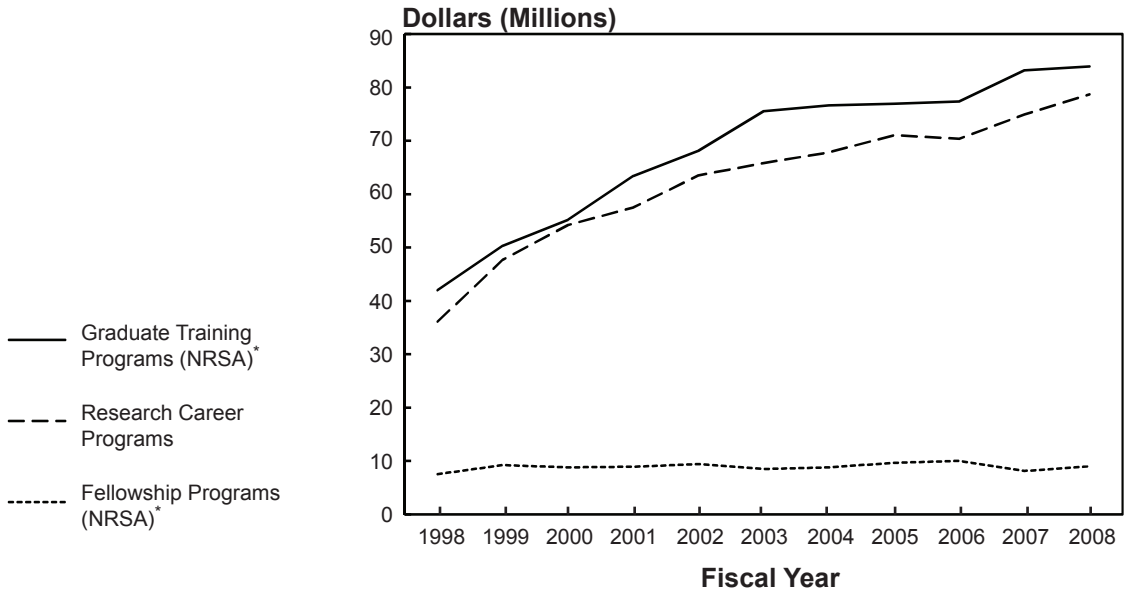
- Thalassemia (Cooley's anemia) Clinical Research Network (see Chapter 11): To establish a group of clinical centers to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones.

The NHLBI supports research efforts that include developing oral chelators to remove iron overload caused by repetitive transfusion therapy, testing drugs to enhance fetal hemoglobin production, and examining hematopoetic transplantation and gene therapy approaches to cure the disease. A registry with samples has been established to foster genomic and proteomic studies. International collaborations have also been initiated.

In 2006, the Institute established the NHLBI Clinical Hematology Research Career Development Program to support career development of clinical researchers in nonmalignant clinical hematology including Cooley's anemia.

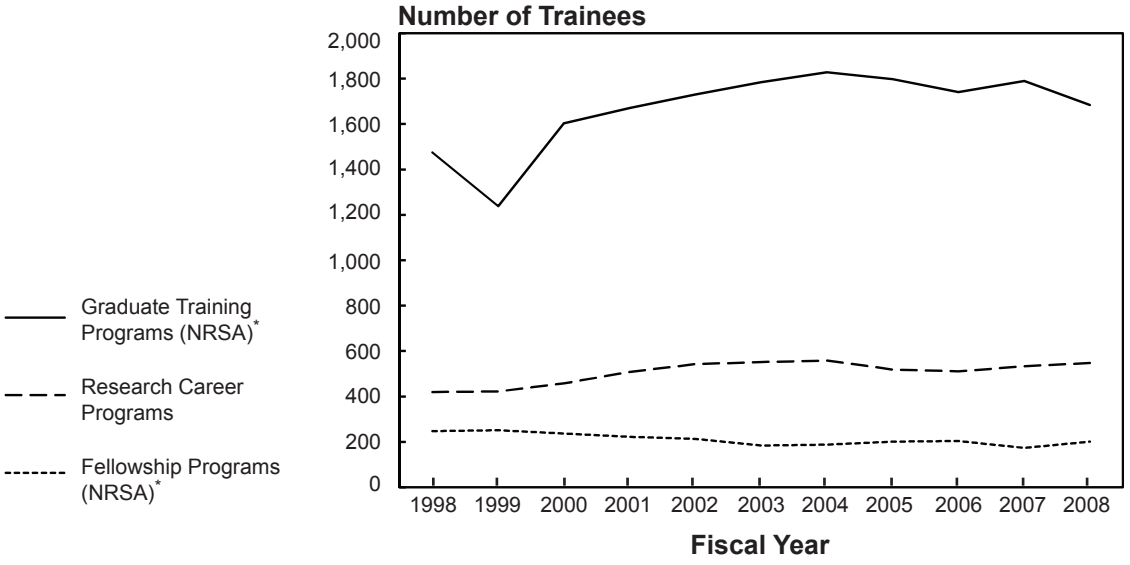
13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 1998–2008



* National Research Service Awards (NRSA).

NHLBI Full-Time Training Positions: Fiscal Years 1998–2008



* National Research Service Awards (NRSA).
Note: Numbers of awards and trainees may not agree with other tables due to the method of counting supplements.

Training Awards, Full-Time Training Positions, and Obligations by Activity: Fiscal Year 2008

	Number of Awards Obligated	Trainees (Full-time Training Positions)	Direct Cost	Indirect Cost	Total Cost	Percent of Total NHLBI Training Program Dollars
Fellowship Programs						
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	20	20	$ 641,047	$ —	$ 641,047	0.7%
Predoctoral Individual NRSA (F31)	56	56	1,887,826	—	1,887,826	2.0
Postdoctoral Individual NRSA (F32)	125	125	6,487,299	—	6,487,299	7.0
Senior Fellowships NRSA (F33)	1	1	58,886	—	58,886	0.1
Subtotal, Fellowships	202	202	9,075,058	—	9,075,058	9.8
Graduate Training Programs						
Institutional NRSA (T32)	220	1,525	74,920,084	5,453,023	80,373,107*	86.4
Minority Institutional NRSA (T32)	3	18	641,890	45,780	687,670	0.7
Off-Quarter Professional Student Training NRSA (T34, T35)	17	93	1,853,697	167,819	2,021,516	2.2
Short-Term Training for Minority Students (T35M)	13	48	706,175	97,474	803,649	0.9
Subtotal, Graduate Training Programs	253	1,684	78,121,846	5,764,096	83,885,942	90.2
Total, Training Programs	**455**	**1,886**	**$87,196,904**	**$5,764,096**	**$92,961,000**	**100.0%**

* Excludes assessment of $1,912,000.

History of Training Obligations by Activity: Fiscal Years 1998–2008

Dollars (Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ 641
Predoctoral Individual NRSA (F31)	466	346	248	264	478	563	549	794	1,202	1,509	1,888
Postdoctoral Individual NRSA (F32)	6,969	8,807	8,517	8,515	8,887	7,868	8,128	8,813	8,790	6,684	6,487
Senior Fellowships NRSA (F33)	125	90	92	147	84	112	144	58	53	—	59
Subtotal, Fellowships	7,560	9,243	8,857	8,926	9,449	8,543	8,821	9,665	10,045	8,193	9,075
Graduate Training Programs											
Institutional NRSA (T32)	37,904[A]	45,551[B]	50,507[C]	58,516[D]	62,999[E]	69,951[F]	71,229[G]	70,524[H]	71,831[I]	78,343[J]	80,373[K]
Minority Institutional NRSA (T32)	706	901	1,167	996	1,092	1,006	734	1,184	743	780	688
Off-Quarter Professional Student Training NRSA (T34, T35)	1,435	1,384	966	1,974	1,987	1,975	1,993	2,233	2,215	2,411	2,021
MARC (T36)	5	5	5	5	—	—	—	—	—	—	—
Short-Term Training for Minority Students (T35M)	1,964	2,494	2,570	1,877	2,057	2,594	2,671	2,976	2,527	1,673	804
Subtotal, Training Grants	42,014	50,335	55,215	63,368	68,135	75,526	76,627	76,917	77,316	83,207	83,886
Total, Training Programs	**$49,574[A]**	**$59,578[B]**	**$64,072[C]**	**$72,294[D]**	**$77,584[E]**	**$84,069[F]**	**$85,448[G]**	**$86,582[H]**	**$87,361[I]**	**$91,400[J]**	**$92,961[K]**

A Excludes Assessment of $1,032,000.
B Excludes Assessment of $1,216,000.
C Excludes Assessment of $1,280,000.
D Excludes Assessment of $1,424,000.
E Excludes Assessment of $1,584,000.
F Excludes Assessment of $1,716,000.
G Excludes Assessment of $1,744,000.
H Excludes Assessment of $1,764,000.
I Excludes Assessment of $1,818,000.
J Excludes Assessment of $1,916,000.
K Excludes Assessment of $1,912,000.

Full-Time Training Positions by Activity: Fiscal Years 1998–2008

	Number of Positions										
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	—	—	—	—	—	—	—	—	—	—	20
Predoctoral Individual NRSA (F31)	19	13	11	12	18	19	18	25	32	44	56
Postdoctoral Individual NRSA (F32)	225	237	225	208	194	164	168	176	171	130	125
Senior Fellowships NRSA (F33)	4	2	2	3	2	2	3	1	2	—	1
Subtotal, Fellowships	248	252	238	223	214	185	189	202	205	174	202
Graduate Training Programs											
Institutional NRSA (T32)	1,423	1,185	1,368	1,425	1,482	1,542	1,578	1,540	1,512	1,585	1,525
Minority Institutional NRSA (T32)	52	53	48	43	39	42	32	35	26	23	18
Off-Quarter Professional Student Training NRSA (T34, T35)	—	—	51	109	179	93	99	95	104	105	93
Short-Term Training for Minority Students (T35M)	—	—	136	93	30	107	119	128	99	77	48
Subtotal, Training Grants	1,475	1,238	1,603	1,670	1,730	1,784	1,828	1,798	1,741	1,790	1,684
Total, Training Positions	**1,723**	**1,490**	**1,841**	**1,893**	**1,944**	**1,969**	**2,017**	**2,000**	**1,946**	**1,964**	**1,886**

NHLBI Research Career Programs: Fiscal Years 1998–2008

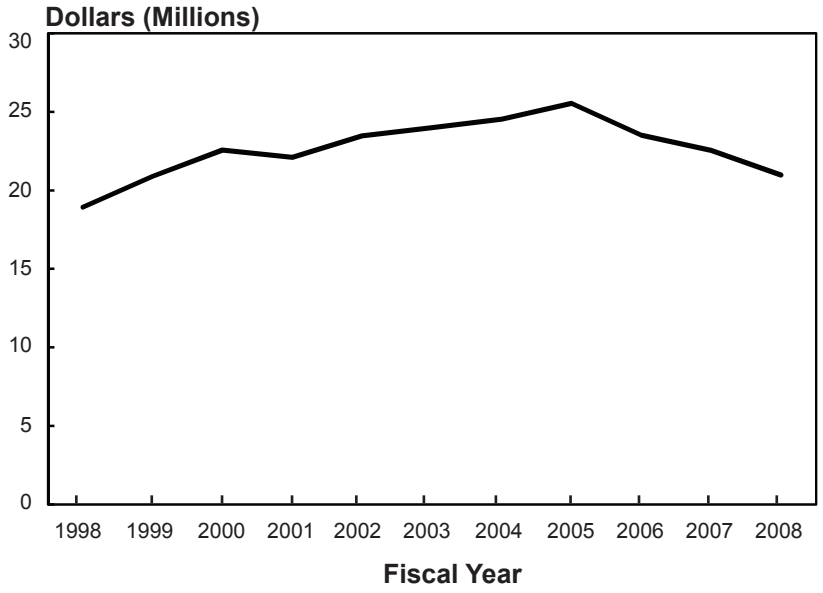
	Number of Awards										
	Fiscal Year										
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Mentored Research Scientist Development Award for Minority Faculty (K01)	19	30	29	44	54	47	46	45	40	35	35
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	—	—	11	9	2	7	6	4	4	5	7
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	—	—	2	2	3	3	3	1
Independent Scientist Award (K02)	14	18	27	34	33	32	31	32	24	25	22
Research Career Development Award (K04)	10	6	1	—	—	—	—	—	—	—	—
Research Career Award (K06)	3	2	2	2	2	2	1	1	1	—	—
Systemic Pulmonary and Vascular Disease Academic Award (K07)	3	3	1	—	—	—	—	—	—	—	—
Asthma Academic Award (K07)	6	3	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	20	13	9	5	—	—	—	—	—	—	—
Sleep Academic Award (K07)	20	20	20	12	8	—	—	—	—	—	—
Nutrition Academic Award (K07)	10	10	19	19	19	9	9	—	—	—	—
Pediatric Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	—	—	4	4
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	—	—	8	14	18	18	18
Clinical Investigator Development Award (K08)	278	262	257	241	236	240	229	239	226	214	210
Physician Scientist Award (K11)	—	—	—	—	—	—	—	—	—	—	—
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	—	—	2	7	7
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	—	—	6	6	6
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	—	—	8	8
Minority School Faculty Development Award (K14)	—	—	4	1	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	37	22	7	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	—	—	1	5	3	2	4	6
NHLBI Career Transition Award (K22)	—	—	—	—	—	—	1	2	1	1	1
Mentored Patient-Oriented Research Career Development Award (K23)	—	13	36	58	90	110	122	127	122	120	133
Midcareer Investigator Award in Patient-Oriented Research (K24)	—	11	20	27	37	38	32	32	33	29	29
Mentored Quantitative Research Career Development Award (K25)	—	—	—	2	7	9	12	17	16	15	15
Clinical Research Curriculum Award (K30)	—	9	16	55	55	55	55	—*	14	16	—
Career Transition Award (K99)	—	—	—	—	—	—	—	—	—	24	47
Total, Research Career Programs	**420**	**422**	**459**	**509**	**543**	**552**	**559**	**519**	**512**	**534**	**549**

* In FY 2005, NHLBI relinquished management of the K30 program and as a result did not receive the grant count.

NHLBI Research Career Program Obligations: Fiscal Years 1998–2008

	Dollars (Thousands)										
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Mentored Research Scientist Development Award for Minority Faculty (K01)	$ 1,723	$ 2,738	$ 3,650	$ 5,556	$ 5,711	$ 6,156	$ 6,150	$ 6,088	$ 5,453	$ 4,718	$ 4,574
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	101	905	1,300	1,143	1,703	991	867	588	567	698	949
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	—	—	255	253	355	358	357	102
Independent Scientist Award (K02)	933	1,548	2,350	3,202	3,130	3,099	3,079	3,218	2,421	2,511	2,184
Research Career Development Award (K04)	684	568	69	—	—	—	—	—	—	—	—
Research Career Award (K06)	103	70	70	70	69	69	34	34	34	—	—
Systemic Pulmonary and Vascular Diseases Academic Award (K07)	386	423	113	—	—	—	—	—	—	—	—
Asthma Academic Award (K07)	509	248	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	1,566	1,161	745	396	—	—	—	—	—	—	—
Sleep Academic Award (K07)	1,734	1,736	1,760	1,081	722	—	—	—	—	—	—
Nutrition Academic Award (K07)	1,491	1,480	2,829	2,869	2,906	1,472	1,516	—	—	—	—
Pediatrics Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	—	—	486	486
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	—	—	925	1,620	2,109	2,232	2,197
Clinical Investigator Development Award (K08)	23,122	29,741	30,189	29,263	29,295	30,288	29,037	30,429	28,973	27,286	27,005
Physician Scientist Award (K11)	—	—	—	—	—	—	—	—	—	—	—
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	—	—	772	3,206	5,499
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	—	—	2,360	2,367	2,364
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	—	—	3,154	3,190
Minority School Faculty Development Award (K14)	618	445	862	98	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	3,099	2,093	393	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	—	—	243	980	512	213	652	1,014
NHLBI Career Transition Award (K22)	—	—	—	—	—	—	185	364	178	160	162
Mentored Patient-Oriented Research Career Development Award (K23)	—	1,687	4,619	7,570	11,909	14,571	16,216	17,086	16,720	16,419	18,556
Midcareer Investigator Award in Patient-Oriented Research (K24)	—	1,054	2,072	2,877	4,058	4,368	3,815	3,929	4,315	4,037	4,161
Mentored Quantitative Research Career Development Award (K25)	—	—	—	272	921	1,195	1,622	2,206	2,184	2,077	2,082
Clinical Research Curriculum Award (K30)	—	1,772	3,163	3,073	3,090	3,110	3,115	4,589	3,708	2,520	—
Career Transition Award (K99)	—	—	—	—	—	—	—	—	—	2,074	4,190
Total, Research Career Program Obligations	**$36,069**	**$47,669**	**$54,184**	**$57,470**	**$63,514**	**$65,817**	**$67,794**	**$71,018**	**$70,365**	**$74,954**	**$78,715**

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1998–2008



NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1998–2008

	Dollars (Thousands)										
	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
MARC Summer Research Training Program	$ —	$ 10	$ 4	$ 20	$ 15	$ 4	$ —	$ —	$ —	$ —	$ —
Mentored Research Scientist Development Award for Minority Faculty	1,723	2,738	3,650	5,556	5,711	6,156	6,150	6,088	5,453	4,718	4,574
MARC	5	—	5	5	—	—	—	—	—	—	—
Minority Biomedical Research Support (MBRS)	2,978	3,423	3,873	3,165	2,793	3,600	2,806	2,846	2,403	2,475	1,527
Minority Institution Faculty Mentored Research Scientist Development Award	101	905	1,300	1,143	1,703	991	867	588	567	698	949
Minority Institution Research Training Program	706	901	1,167	996	1,092	1,006	734	1,184	743	780	688
Minority Predoctoral Fellowship	436	345	248	264	278	308	374	545	1,012	1,115	1,728
Minority Research Supplements Program	7,043	7,440	8,304	8,587	9,822	9,323	10,938	11,214	10,680	10,834	10,303
Minority School Faculty Development Award	618	445	862	98	—	—	—	—	—	—	—
Reentry Supplements	249	106	176	384	—	—	—	96	132	245	401
Research Development Award for Minority Faculty	3,099	2,093	393	—	—	—	—	—	—	—	—
Short-Term Training for Minority Students	1,964	2,494	2,570	1,876	2,057	2,594	2,671	2,976	2,526	1,673	804
Total, Minority Programs	**$18,922**	**$20,900**	**$22,552**	**$22,094**	**$23,471**	**$23,982**	**$24,540**	**$25,537**	**$23,516**	**$22,538**	**$20,974**

NHLBI Research Supplements Program by Award Type: Fiscal Years 1998–2008

Number of Awards

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Minority Supplements											
Investigator	31	32	33	33	46	47	35	29	27	31	25
Postdoctoral	50	47	42	41	33	38	37	52	49	43	42
Graduate	48	53	47	43	45	57	61	80	74	73	69
Undergraduate	25	17	19	12	17	18	17	12	11	16	17
High School	11	6	—	3	3	4	3	7	3	3	3
Post-Master/Post-Baccalaureate	—	—	—	—	2	8	17	16	11	4	9
Reentry Supplements	3	2	1	3	—	—	3	2	1	1	3
Disability Supplements	2	1	5	4	5	4	3	2	2	4	1
Total, Research Supplements Program	**170**	**158**	**147**	**139**	**151**	**176**	**176**	**200**	**178**	**175**	**169**

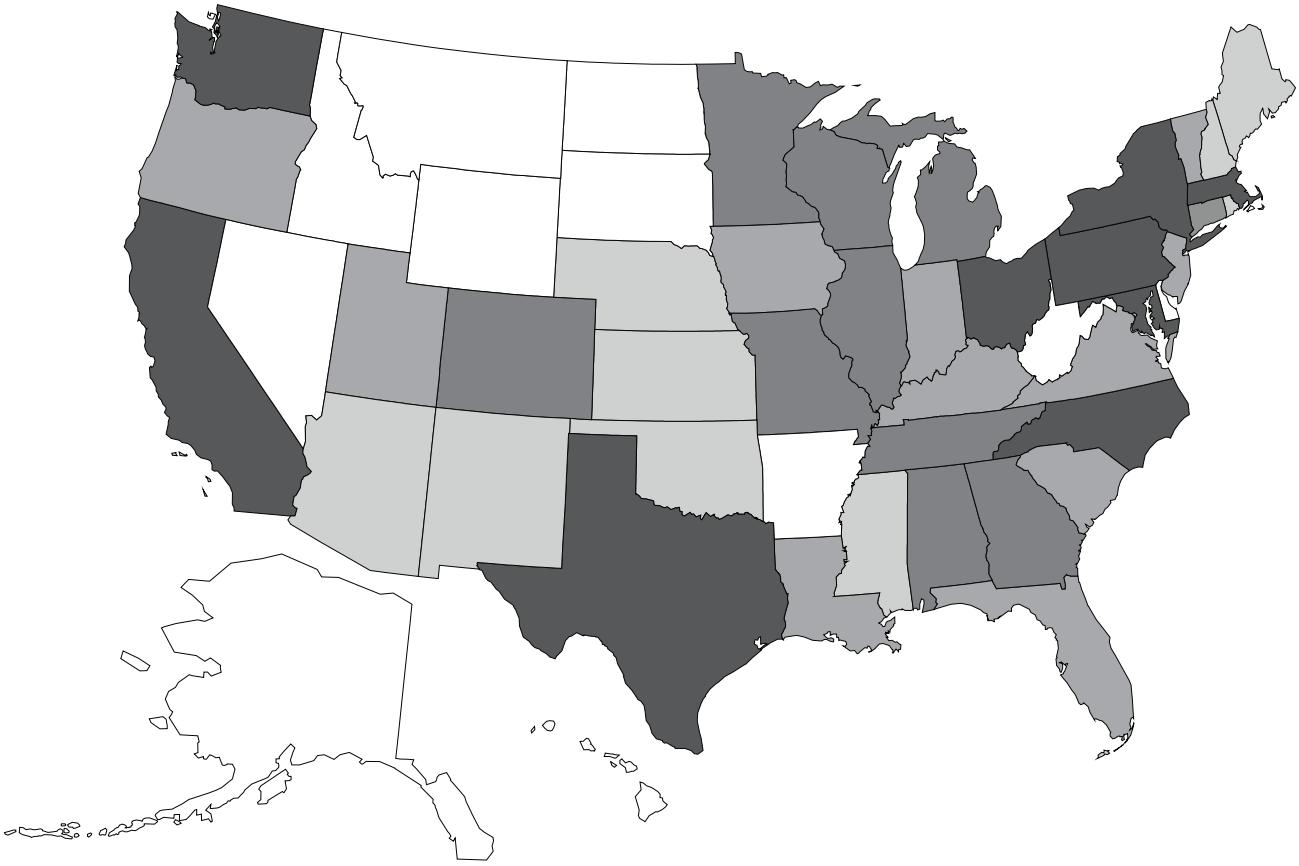
NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1998–2008

Dollars (Thousands)

	Fiscal Year										
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Minority Supplements											
Investigator	$2,185	$2,331	$3,262	$3,430	$ 5,046	$3,844	$ 4,256	$ 3,552	$ 3,343	$ 3,719	$ 3,285
Postdoctoral	3,032	3,110	3,053	3,086	2,554	2,655	2,713	3,432	3,542	3,284	3,074
Graduate	1,527	1,806	1,791	1,818	1,864	2,181	2,439	3,208	3,114	3,021	3,029
Undergraduate	246	166	198	235	260	301	282	179	178	350	424
High School	53	27	—	18	33	33	13	30	18	16	26
Post-Master/Post-Baccalaureate	—	—	—	—	65	309	597	618	352	156	367
Reentry Supplements	249	106	176	384	—	—	495	96	132	245	401
Disability Supplements	96	72	282	187	474	360	143	99	133	288	98
Total, Research Supplements Program	**$7,388**	**$7,618**	**$8,762**	**$9,158**	**$10,296**	**$9,683**	**$10,938**	**$11,214**	**$10,812**	**$11,079**	**$10,704**

14. Geographic Distribution of Awards: Fiscal Year 2008

Geographic Distribution of Awards by State: Fiscal Year 2008



Geographic Distribution of Awards by State or Country: Fiscal Year 2008

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Alabama								
Cooper Green Hospital (Birmingham)	1	$ 536,831	1	$ 536,831	—	$ —	—	$ —
Elgavish Paramagnetics, Inc.	1	380,811	1	380,811	—	—	—	—
University of Alabama at Birmingham	63	32,431,246	51	25,344,786	7	1,406,107	5	5,680,353
University of South Alabama	16	5,348,515	13	5,066,368	3	282,147	—	—
Total Alabama	**81**	**38,697,403**	**66**	**31,328,796**	**10**	**1,688,254**	**5**	**5,680,353**
Alaska								
Norton Sound Health Corporation	1	481,316	1	481,316	—	—	—	—
University of Alaska, Anchorage	1	197,652	1	197,652	—	—	—	—
University of Alaska, Fairbanks	1	181,987	1	181,987	—	—	—	—
Total Alaska	**3**	**860,955**	**3**	**860,955**	**—**	**—**	**—**	**—**
Arizona								
Arizona State University-Polytechnic Campus	2	477,493	2	477,493	—	—	—	—
Arizona State University-Tempe Campus	4	1,089,780	4	1,089,780	—	—	—	—
Diné College	1	382,162	1	382,162	—	—	—	—
Mayo Clinic, Arizona	1	58,036	—	—	1	58,036	—	—
Translational Genomics Research Institute	2	774,373	2	774,373	—	—	—	—
University of Arizona	25	8,772,709	20	7,779,011	4	800,949	1	192,749
Western Research Company, Inc.	2	413,660	2	413,660	—	—	—	—
Total Arizona	**37**	**11,968,213**	**31**	**10,916,479**	**5**	**858,985**	**1**	**192,749**
Arkansas								
Arkansas Children's Hospital Research Institute	3	882,232	3	882,232	—	—	—	—
University of Arkansas	3	743,471	3	743,471	—	—	—	—
University of Arkansas for Medical Sciences, Little Rock	5	1,620,721	5	1,620,721	—	—	—	—
Total Arkansas	**11**	**3,246,424**	**11**	**3,246,424**	**—**	**—**	**—**	**—**
California								
BioTechPlex Corporation	1	489,192	1	489,192	—	—	—	—
Blood Systems Research Institute	3	1,832,315	3	1,832,315	—	—	—	—
Burnham Institute for Medical Research	11	7,318,563	11	7,318,563	—	—	—	—
California Institute of Technology	4	1,146,126	3	1,101,280	1	44,846	—	—
California Pacific Medical Center Research Institute	2	1,014,242	1	581,583	—	—	1	432,659
California State University, San Bernardino	—	58,855	—	58,855	—	—	—	—
Cardiovascular Simulation, Inc.	1	99,963	—	—	—	—	1	99,963
Cedars-Sinai Medical Center	8	5,864,668	8	5,864,668	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Children's Hospital and Research Center at Oakland	15	6,354,267	13	5,887,577	1	100,488	1	366,202
Children's Hospital Los Angeles	11	5,373,219	11	5,373,219	—	—	—	—
Children's Hospital of Orange County	1	127,041	—	—	1	127,041	—	—
City of Hope/Beckman Research Institute	6	2,169,972	6	2,169,972	—	—	—	—
Diagnostics for the Real World, Ltd.	1	1,762,981	1	1,762,981	—	—	—	—
Encode Bio, Inc.	1	204,828	1	204,828	—	—	—	—
HeartVista, Inc.	1	140,712	1	140,712	—	—	—	—
Ibis Biosciences, Inc.	1	338,153	1	338,153	—	—	—	—
Intelligent Fiber Optic Systems Corp	1	149,871	1	149,871	—	—	—	—
J. David Gladstone Institutes	7	5,448,334	7	5,448,334	—	—	—	—
Kaiser Foundation Research Institute	11	6,859,469	6	4,579,348	—	—	5	2,280,121
Keck Graduate Institute of Applied Life Sciences	1	378,750	1	378,750	—	—	—	—
LA Biomedical Research Institute/Harbor UCLA Medical Center	8	2,166,859	5	1,378,913	—	—	3	787,948
La Jolla Bioengineering Institute	3	1,283,722	3	1,283,722	—	—	—	—
La Jolla Institute for Allergy & Immunology	1	412,918	1	412,918	—	—	—	—
Loma Linda University	5	1,424,349	4	1,365,546	1	58,803	—	—
March of Dimes Birth Defects Foundation	1	297,982	1	297,982	—	—	—	—
Molecular Express, Inc.	1	585,036	1	585,036	—	—	—	—
National Childhood Cancer Foundation	1	53,378	1	53,378	—	—	—	—
Northern California Institute Research and Education	10	4,426,156	10	4,426,156	—	—	—	—
Orthopaedic Hospital	1	355,750	1	355,750	—	—	—	—
Palo Alto Institute for Research and Education, Inc.	2	1,001,667	2	1,001,667	—	—	—	—
Panorama Research Inc.	1	903,306	1	903,306	—	—	—	—
PhiloMetron, Inc.	1	328,746	1	328,746	—	—	—	—
Physical Optics Corporation	1	373,474	1	373,474	—	—	—	—
Predictive Biology	1	447,153	1	447,153	—	—	—	—
Rand Corporation	4	3,060,162	4	3,060,162	—	—	—	—
Regents of the University of California	1	130,519	—	—	—	—	1	130,519
Salk Institute for Biological Studies	2	2,117,099	2	2,117,099	—	—	—	—
San Diego State University	13	7,831,990	10	5,142,032	2	58,428	1	2,631,530
Science Applications International Corporation	1	2,727,792	—	—	—	—	1	2,727,792
Scripps Research Institute	25	15,019,300	24	14,579,537	1	439,763	—	—
Sidney Kimmel Cancer Center	2	1,132,327	2	1,132,327	—	—	—	—
SRI International	1	262,266	1	262,266	—	—	—	—
Stanford University	64	25,308,535	52	19,840,990	10	1,483,678	2	3,983,867
SynZyme Technologies LLC	1	100,037	—	—	—	—	1	100,037
Torrey Pines Institute for Molecular Studies	2	832,594	2	832,594	—	—	—	—
Tristan Technologies, Inc.	1	465,713	1	465,713	—	—	—	—
University of California, Berkeley	9	3,068,506	6	2,958,544	3	109,962	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of California, Davis	35	12,922,354	31	11,575,243	2	516,624	2	830,487
University of California, Irvine	17	5,890,407	16	5,742,276	—	—	1	148,131
University of California, Lawrence Berkeley National Laboratory	2	629,691	2	629,691	—	—	—	—
University of California, Los Angeles	75	33,269,982	62	30,821,708	11	1,671,118	2	777,156
University of California, Merced	2	420,972	1	380,000	1	40,972	—	—
University of California, Riverside	2	172,827	1	143,215	1	29,612	—	—
University of California, San Diego	86	43,099,907	73	38,954,529	12	3,020,378	1	1,125,000
University of California, San Francisco	101	38,882,351	91	36,580,131	9	1,899,538	—	—
University of California, Santa Barbara	3	909,100	3	909,100	—	—	1	402,682
University of Southern California	21	8,610,409	20	8,569,138	1	41,271	—	—
Vala Sciences, Inc.	1	628,906	1	628,906	—	—	—	—
Vascular Biosciences	1	165,745	1	165,745	—	—	—	—
Veterans Medical Research Foundation, San Diego	6	3,964,540	6	3,964,540	—	—	—	—
Total California	**602**	**272,816,048**	**521**	**246,349,434**	**57**	**9,642,522**	**24**	**16,824,092**
Colorado								
Advanced MicroLabs LLC	1	368,039	1	368,039	—	—	—	—
Aerophase, Inc.	1	762,540	1	762,540	—	—	—	—
Colorado State University, Fort Collins	6	942,605	5	913,800	1	28,805	—	—
Denver Health and Hospital Authority	2	1,015,506	1	548,686	—	—	1	466,820
Kestrel Labs, Inc.	1	998,972	1	998,972	—	—	—	—
Keystone Symposia	1	18,000	1	18,000	—	—	—	—
Klein Buendel, Inc.	2	658,379	2	658,379	—	—	—	—
National Jewish Medical and Research Center	27	21,161,322	27	21,161,322	—	—	—	—
PHCC, LP	1	693,180	1	693,180	—	—	—	—
Quest Product Development Corporation	1	560,127	1	560,127	—	—	—	—
Rocky Mountain Biosystems, Inc.	1	497,310	1	497,310	—	—	—	—
Taiga Biotechnologies, Inc.	1	161,192	1	161,192	—	—	—	—
University of Colorado at Boulder	8	2,930,039	8	2,930,039	—	—	—	—
University of Colorado at Denver and Health Science Center	51	19,178,080	41	16,450,548	7	1,848,533	3	878,999
Valvexchange, Inc.	1	1,283,334	1	1,283,334	—	—	—	—
Total Colorado	**105**	**51,228,625**	**93**	**48,005,468**	**8**	**1,877,338**	**4**	**1,345,819**
Connecticut								
Evergen Biotechnologies, Inc.	2	729,091	2	729,091	—	—	—	—
Gaylord Hospital, Inc.	1	164,784	1	164,784	—	—	—	—
Hartford Hospital	2	867,930	2	867,930	—	—	—	—
John B. Pierce Laboratory, Inc.	1	604,679	1	604,679	—	—	—	—
University of Connecticut School of Medicine and Dental Medicine	11	3,791,889	11	3,791,889	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Connecticut, Storrs	2	551,202	2	551,202	—	—	—	—
Yale University	72	39,777,776	62	32,995,953	9	2,473,243	1	4,308,580
Total Connecticut	**91**	**46,487,351**	**81**	**39,705,528**	**9**	**2,473,243**	**1**	**4,308,580**
Delaware								
University of Delaware	2	697,553	2	697,553	—	—	—	—
Total Delaware	**2**	**697,553**	**2**	**697,553**	**—**	**—**	**—**	**—**
District of Columbia								
Academy for Educational Development	4	3,142,977	—	—	—	—	4	3,142,977
American Institutes for Research	1	5,238,716	—	—	—	—	1	5,238,716
American Society of Hematology	1	15,000	1	15,000	—	—	—	—
Children's Research Institute	5	1,900,057	4	1,458,096	—	—	1	441,961
George Washington University	6	2,793,463	4	2,582,209	1	58,886	1	152,368
Georgetown University	11	5,290,808	10	5,232,966	1	57,842	0	0
Hager Sharp, Inc.	1	828,477	—	—	—	—	1	828,477
Howard University	10	4,226,278	7	3,565,438	1	40,972	2	619,868
Ogilvy Public Relations Worldwide	1	40,375	—	—	—	—	1	40,375
State of the Art, Inc.	1	148,933	1	148,933	—	—	—	—
U.S. Bureau of the Census	1	474,000	—	—	—	—	1	474,000
Veterans Affairs Medical Center	2	329,881	—	—	—	—	2	329,881
Total District of Columbia	**44**	**24,428,965**	**27**	**13,002,642**	**3**	**157,700**	**14**	**11,268,623**
Florida								
ArchieMD, Inc.	1	185,602	1	185,602	—	—	—	—
Florida Institute of Technology	1	306,144	1	306,144	—	—	—	—
H. Lee Moffitt Cancer Center and Research Institute	3	954,527	3	954,527	—	—	—	—
Mount Sinai Medical Center, Miami Beach	1	274,385	1	274,385	—	—	—	—
Nemours Children's Clinic	1	164,913	1	164,913	—	—	—	—
Nova Southeastern University	1	189,905	1	189,905	—	—	—	—
University of Central Florida	2	568,000	2	568,000	—	—	—	—
University of Florida	41	15,262,307	35	14,464,241	5	450,750	1	347,316
University of Miami	3	3,475,487	—	—	—	—	3	3,475,487
University of Miami, Coral Gables	3	3,086,572	2	2,946,368	1	140,204	—	—
University of Miami School of Medicine	22	9,272,892	18	8,764,880	4	508,012	—	—
University of South Florida	3	778,706	3	778,706	—	—	—	—
Winprobe Corporation	2	648,623	2	648,623	—	—	—	—
Total Florida	**84**	**35,168,063**	**70**	**30,246,294**	**10**	**1,098,966**	**4**	**3,822,803**
Georgia								
Emory University	62	23,969,623	54	22,976,385	7	770,317	1	222,921
Expression Therapeutics, LLC	1	100,000	1	100,000	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Georgia Institute of Technology	9	2,807,117	9	2,807,117	—	—	—	—
Georgia State University	1	34,572	—	—	1	34,572	—	—
Medical College of Georgia	34	14,524,107	30	13,995,954	4	528,153	—	—
Morehouse School of Medicine	11	3,394,879	10	3,066,804	1	328,075	—	—
Transfusion and Transplantation Technologies	2	615,938	2	615,938	—	—	—	—
University of Georgia	1	52,048	—	—	1	52,048	—	—
U.S. Centers for Disease Control and Prevention	1	725,000	—	—	—	—	1	725,000
Total Georgia	**122**	**46,223,284**	**106**	**43,562,198**	**14**	**1,713,165**	**2**	**947,921**
Hawaii								
Queen's Medical Center	1	557,531	1	557,531	—	—	—	—
University of Hawaii at Manoa	6	3,099,638	5	2,894,941	—	—	1	204,697
Total Hawaii	**7**	**3,657,169**	**6**	**3,452,472**	**—**	**—**	**1**	**204,697**
Illinois								
AJ Medical Devices, Inc.	1	993,857	1	993,857	—	—	—	—
Children's Memorial Hospital (Chicago)	4	1,008,930	3	981,176	1	27,754	—	—
Coramed Technologies	1	113,564	1	113,564	—	—	—	—
Evanston Northwestern Healthcare	2	705,528	2	705,528	—	—	—	—
Hektoen Institute for Medical Research, LLC	—	68,000	—	68,000	—	—	—	—
Illinois Institute of Technology	2	736,494	2	736,494	—	—	—	—
Loyola University Chicago	5	3,581,709	5	3,581,709	—	—	—	—
Northwestern University	67	27,769,104	57	22,558,724	6	996,217	4	4,214,163
Rush University Medical Center	10	3,369,605	9	3,319,959	1	49,646	—	—
Southern Illinois University, Carbondale	1	216,750	1	216,750	—	—	—	—
University of Chicago	59	22,385,386	53	20,486,813	6	1,898,573	—	—
University of Illinois at Chicago	53	25,827,838	49	24,099,490	3	1,383,353	1	344,995
University of Illinois at Urbana-Champaign	6	2,042,282	6	2,042,282	—	—	—	—
Total Illinois	**211**	**88,819,047**	**189**	**79,904,346**	**17**	**4,355,543**	**5**	**4,559,158**
Indiana								
Ball State University	1	216,750	1	216,750	—	—	—	—
General Biotechnology, LLC	1	485,178	1	485,178	—	—	—	—
Indiana University	1	795,274	—	—	—	—	1	795,274
Indiana University, Bloomington	1	359,123	1	359,123	—	—	—	—
Indiana University-Purdue University at Indianapolis	44	17,827,755	39	17,169,631	5	658,124	—	—
Predictive Physiology and Medicine Inc.	1	1,475,837	1	1,475,837	—	—	—	—
Purdue University, West Lafayette	3	527,564	2	477,918	1	49,646	—	—
SonarMed, Inc.	1	1,000,000	1	1,000,000	—	—	—	—
University of Notre Dame	3	2,497,112	3	2,497,112	—	—	—	—
Total Indiana	**56**	**25,184,593**	**49**	**23,681,549**	**6**	**707,770**	**1**	**795,274**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Iowa								
Iowa State University	1	687,588	1	687,588	—	—	—	—
Maharishi University of Management Research Institute	1	680,561	1	680,561	—	—	—	—
Porcinogen, LLC	1	99,537	1	99,537	—	—	—	—
University of Iowa	63	31,748,311	56	29,385,994	6	2,163,177	1	199,140
Total Iowa	**66**	**33,215,997**	**59**	**30,853,680**	**6**	**2,163,177**	**1**	**199,140**
Kansas								
Kansas State University	1	219,000	1	219,000	—	—	—	—
University of Kansas Medical Center	10	4,109,840	10	4,109,840	—	—	—	—
Total Kansas	**11**	**4,328,840**	**11**	**4,328,840**	—	—	—	—
Kentucky								
Endoprotech, Inc.	1	498,890	1	498,890	—	—	—	—
Pharmacogenetics Diagnostic Laboratories	1	807,578	1	807,578	—	—	—	—
Regenerex LLC	1	711,438	1	711,438	—	—	—	—
SCR, Inc.	1	708,881	1	708,881	—	—	—	—
University of Kentucky	29	11,424,397	26	11,120,132	3	304,265	—	—
University of Louisville	22	8,671,123	21	8,496,771	1	174,352	—	—
Total Kentucky	**55**	**22,822,307**	**51**	**22,343,690**	**4**	**478,617**	—	—
Louisiana								
Life Recovery Systems HD, LLC	1	707,816	1	707,816	—	—	—	—
Louisiana State University	1	354,532	1	354,532	—	—	—	—
Louisiana State University and Agricultural & Mechanical College, Baton Rouge	1	337,965	1	337,965	—	—	—	—
Louisiana State University Health Sciences Center New Orleans	5	3,024,737	4	3,000,545	—	—	1	24,192
Louisiana State University Health Sciences Center Shreveport	7	1,645,469	6	1,598,643	1	46,826	—	—
Louisiana State University Pennington Biomedical Research Center	2	733,818	2	733,818	—	—	—	—
Ochsner Clinic Foundation	1	554,393	1	554,393	—	—	—	—
Southeastern Louisiana University	1	186,895	1	186,895	—	—	—	—
Tulane University of Louisiana	19	8,901,593	18	8,855,621	1	45,972	—	—
Total Louisiana	**38**	**16,447,218**	**35**	**16,330,228**	**2**	**92,798**	**1**	**24,192**
Maine								
Bates College	1	210,000	1	210,000	—	—	—	—
Jackson Laboratory	6	2,212,387	5	2,057,772	1	154,615	—	—
Maine Medical Center	4	1,089,653	3	1,040,007	1	49,646	—	—
University of Maine, Orono	1	673,251	1	673,251	—	—	—	—
Total Maine	**12**	**4,185,291**	**10**	**3,981,030**	**2**	**204,261**	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Maryland								
American Institutes for Research	2	1,385,259	—	—	—	—	2	1,385,259
Biological Reagents, Bethesda	2	2,285,500	—	—	—	—	2	2,285,500
Bon Secours Hospital, Baltimore	1	576,813	1	576,813	—	—	—	—
Clinical Trials and Surveys Corporation	2	2,411,935	1	727,789	—	—	1	1,684,146
Dawnbreaker, Inc.	1	34,000	—	—	—	—	1	34,000
EMMES Corporation	2	715,011	1	696,820	—	—	1	18,191
Engineering and Scientific Research Associates	1	431,384	1	431,384	—	—	—	—
Federation of American Society for Experimental Biology	1	25,000	1	25,000	—	—	—	—
Foresight Science and Technology, Inc.	1	34,000	—	—	—	—	1	34,000
Henry M. Jackson Foundation for the Advancement of Military Medicine	2	4,299,891	1	539,628	—	—	1	3,760,263
Infinite Biomedical Technologies, LLC	1	821,268	1	821,268	—	—	—	—
Information Management Services, Inc.	1	737,491	—	—	—	—	1	737,491
J. Craig Venter Institute, Inc.	1	399,878	—	—	—	—	1	399,878
Johns Hopkins University	156	82,167,280	126	66,895,594	21	4,278,434	9	10,993,252
Key Technologies, Inc.	1	119,657	1	119,657	—	—	—	—
Larta Institute	1	102,000	—	—	—	—	1	102,000
Maryland Medical Research Institute	1	494,495	1	494,495	—	—	—	—
MaxCyte, Inc.	1	414,658	1	414,658	—	—	—	—
MedStar Research Institute	4	3,253,549	3	2,917,630	—	—	1	335,919
National Institutes of Health	6	3,830,175	—	—	—	—	6	3,830,175
North American Vascular Biology Organization	3	45,000	3	45,000	—	—	—	—
Paragon Bioservices, Inc.	1	3,498,791	—	—	—	—	1	3,498,791
Peace Technology, Inc.	1	1,076,545	—	—	—	—	1	1,076,545
Perinatronics Medical Systems, Inc.	1	864,070	1	864,070	—	—	—	—
Quality Biological, Inc.	1	402,231	1	402,231	—	—	—	—
Seracare Bioservices	1	3,560,582	—	—	—	—	1	3,560,582
Social and Scientific Systems, Inc.	1	2,359,380	—	—	—	—	1	2,359,380
Suburban Hospital	1	5,296,600	—	—	—	—	—	5,296,600
U.S. Department of Health and Human Services	3	483,939	3	—	—	—	3	483,939
U.S. Food and Drug Administration	2	315,000	—	—	—	—	2	315,000
U.S. PHS Indian Health Service	2	196,081	—	—	—	—	2	196,081
University of Maryland, Baltimore	37	17,511,599	34	17,401,482	3	110,117	—	—
University of Maryland, College Park	3	390,627	3	390,627	—	—	—	—
Weinberg Medical Physics, LLC	1	690,148	1	690,148	—	—	—	—
Westat, Inc.	1	6,388,357	—	—	—	—	1	6,388,357
Total Maryland	**247**	**147,618,194**	**185**	**94,454,294**	**24**	**4,388,551**	**41**	**48,775,349**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Massachusetts								
ABIOMED, Inc.	2	864,009	2	864,009	—	—	—	—
Aerodyne Research, Inc	1	382,539	1	382,539	—	—	—	—
Baystate Medical Center	1	268,882	—	—	—	—	1	268,882
Beth Israel Deaconess Medical Center	61	26,365,246	53	24,486,492	8	1,878,754	—	—
BioHelix Corporation	1	155,774	1	155,774	—	—	—	—
BioPhysics Assay Laboratory, Inc. (BioPAL)	1	394,897	1	394,897	—	—	—	—
BioSense Technologies, Inc.	1	444,710	1	444,710	—	—	—	—
BioSurfaces	2	349,999	2	349,999	—	—	—	—
Boston Biomedical Research Institute	3	1,966,594	3	1,966,594	—	—	—	—
Boston Medical Center	8	3,547,065	8	3,547,065	—	—	—	—
Boston University	10	8,628,195	9	5,308,588	—	—	1	3,319,607
Boston University Medical Campus	52	28,442,957	48	26,121,015	4	2,321,942	—	—
Brandeis University	2	446,191	2	446,191	—	—	—	—
Brigham and Women's Hospital	129	66,146,341	113	60,887,467	13	4,096,933	3	1,161,941
Caritas St. Elizabeth's Medical Center	2	331,374	2	331,374	—	—	—	—
Cell Imaging Systems, LLC	1	484,258	1	484,258	—	—	—	—
Children's Hospital Boston	50	22,254,002	44	20,378,369	6	1,875,633	—	—
Clark University	1	223,500	1	223,500	—	—	—	—
Dana-Farber Cancer Institute	11	3,905,882	11	3,905,882	—	—	—	—
E.P., Ltd	1	1,304,033	1	1,304,033	—	—	—	—
Genetix Pharmaceuticals, Inc.	1	249,705	1	249,705	—	—	—	—
Giner, Inc.	1	149,230	1	149,230	—	—	—	—
Gwathmey, Inc.	2	3,095,138	2	3,095,138	—	—	—	—
Harvard Pilgrim Health Care, Inc.	3	1,292,628	3	1,292,628	—	—	—	—
Harvard University	3	947,455	2	591,950	1	355,505	—	—
Harvard University Medical School	10	5,761,399	9	4,808,759	1	952,640	—	—
Harvard University School of Public Health	19	6,925,173	16	6,276,776	3	648,397	—	—
Immune Disease Institute, Inc.	4	7,469,062	4	7,469,062	—	—	—	—
Immunetics, Inc.	1	756,803	1	756,803	—	—	—	—
InfoSciTex Corporation	1	199,982	1	199,982	—	—	—	—
IQuum, Inc.	1	991,737	1	991,737	—	—	—	—
Joslin Diabetes Center	1	640,107	1	640,107	—	—	—	—
Levitronix, LLC	3	2,171,112	3	2,171,112	—	—	—	—
Massachusetts General Hospital	65	26,955,016	60	25,553,078	4	1,366,832	1	35,106
Massachusetts Institute of Technology	11	9,629,502	8	7,580,321	2	89,768	1	1,959,413
Medical Discovery Partners LLC	1	228,220	1	228,220	—	—	—	—
New England Research Institutes, Inc.	6	31,375,817	5	23,463,403	—	—	1	7,912,414
Newton Laboratories	2	451,851	2	451,851	—	—	—	—
Northeastern University	1	260,510	1	260,510	—	—	—	—
Phylonix Pharmaceuticals, Inc.	1	135,227	1	135,227	—	—	—	—
Physical Sciences, Inc.	1	594,244	1	594,244	—	—	—	—
Radiation Monitoring Devices, Inc.	2	561,211	2	561,211	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Spaulding Rehabilitation Hospital	1	369,321	1	369,321	—	—	—	—
Stethographics, Inc.	1	150,000	1	150,000	—	—	—	—
Trustees of Boston University	1	23,134,059	—	—	—	—	1	23,134,059
Tufts Medical Center	25	9,248,034	22	9,075,470	1	71,006	2	101,558
Tufts University, Boston	9	2,913,140	7	2,342,804	1	219,499	1	350,837
University of Massachusetts, Amherst	1	193,146	1	193,146	—	—	—	—
University of Massachusetts Medical School, Worcester	20	8,389,860	18	8,182,523	1	28,565	1	178,772
Vasotech, Inc.	1	202,313	1	202,313	—	—	—	—
Whalen Biomedical Inc.	2	189,335	2	189,335	—	—	—	—
Whitehead Institute for Biomedical Research	1	292,500	1	292,500	—	—	—	—
Total Massachusetts	**542**	**312,829,285**	**484**	**260,501,222**	**45**	**13,905,474**	**13**	**38,422,589**
Michigan								
AlphaCore Pharma LLC	1	240,129	1	240,129	—	—	—	—
Henry Ford Health System	11	6,140,005	11	6,140,005	—	—	—	—
MC3, Inc.	4	1,025,050	4	1,025,050	—	—	—	—
MedArray, Inc.	2	1,325,275	2	1,325,275	—	—	—	—
Michigan State University	6	2,973,374	6	2,973,374	—	—	—	—
Michigan Technological University	2	445,490	2	445,490	—	—	—	—
Magnetic Resonance Imaging Institute for Biomedical Research	1	420,633	1	420,633	—	—	—	—
St. Joseph Mercy Oakland	2	724,938	2	724,938	—	—	—	—
University of Michigan	2	910,605	—	—	—	—	2	910,605
University of Michigan at Ann Arbor	106	44,119,522	100	42,044,310	6	2,075,212	—	—
Van Andel Research Institute	1	455,000	1	455,000	—	—	—	—
Wayne State University	20	6,579,504	19	6,446,154	—	—	1	133,350
Total Michigan	**158**	**65,359,525**	**149**	**62,240,358**	**6**	**2,075,212**	**3**	**1,043,955**
Minnesota								
Advanced Circulatory Systems, Inc.	1	1,490,894	1	1,490,894	—	—	—	—
Discovery Genomics, Inc.	1	566,484	1	566,484	—	—	—	—
HealthPartners Research Foundation	2	1,257,330	2	1,257,330	—	—	—	—
Imricor Medical Systems, Inc.	1	917,899	1	917,899	—	—	—	—
Koronis Biomedical Technologies Corporation	1	583,411	1	583,411	—	—	—	—
Mayo Clinic College of Medicine, Rochester	49	20,879,054	45	20,342,420	2	417,277	2	119,357
Minneapolis Medical Research Foundation, Inc.	2	1,298,525	1	298,525	—	—	1	1,000,000
Powerscope, Inc	1	351,355	1	351,355	—	—	—	—
University of Minnesota	1	363,767	—	—	—	—	1	363,767
University of Minnesota, Twin Cities	65	32,864,192	56	28,377,879	6	1,466,821	3	3,019,492
Total Minnesota	**124**	**60,572,911**	**109**	**54,186,197**	**8**	**1,884,098**	**7**	**4,502,616**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Mississippi								
Central Mississippi Civic Improvement Association	1	593,523	1	593,523	—	—	—	—
Jackson State University	2	3,621,548	1	174,222	—	—	1	3,447,326
Tougaloo College	1	1,030,181	—	—	—	—	1	1,030,181
University of Mississippi Medical Center	17	7,479,127	13	5,978,070	—	—	4	1,501,057
Total Mississippi	**21**	**12,724,379**	**15**	**6,745,815**	**—**	**—**	**6**	**5,978,564**
Missouri								
Cardiovascular Imaging Technologies	1	117,839	1	117,839	—	—	—	—
Children's Mercy Hospital, Kansas City	2	387,022	2	387,022	—	—	—	—
Mid-America Heart Institute of St. Luke's Hospital	1	388,246	1	388,246	—	—	—	—
Saint Louis University	8	2,719,552	8	2,719,552	—	—	—	—
University of Missouri, Kansas City	1	219,090	1	219,090	—	—	—	—
University of Missouri, Columbia	24	9,422,030	21	9,310,566	3	111,464	—	—
Washington University	114	58,608,725	102	54,817,781	11	3,269,521	1	521,423
Total Missouri	**151**	**71,862,504**	**136**	**67,960,096**	**14**	**3,380,985**	**1**	**521,423**
Montana								
Montana State University, Bozeman	1	406,539	1	406,539	—	—	—	—
University of Montana	2	394,439	2	394,439	—	—	—	—
Total Montana	**3**	**800,978**	**3**	**800,978**	**—**	**—**	**—**	**—**
Nebraska								
Creighton University	2	425,034	2	425,034	—	—	—	—
University of Nebraska, Lincoln	2	2,136,866	2	2,136,866	—	—	—	—
University of Nebraska Medical Center	7	3,303,318	7	3,303,318	—	—	—	—
Total Nebraska	**11**	**5,865,218**	**11**	**5,865,218**	**—**	**—**	**—**	**—**
Nevada								
Nevada Cancer Institute	1	450,000	1	450,000	—	—	—	—
University of Nevada, Reno	7	2,174,002	6	1,935,363	—	—	1	238,639
Total Nevada	**8**	**2,624,002**	**7**	**2,385,363**	**—**	**—**	**1**	**238,639**
New Hampshire								
Dartmouth College	16	5,968,064	15	5,911,926	1	56,138	—	—
Xemed, LLC	4	971,316	4	971,316	—	—	—	—
Total New Hamshire	**20**	**6,939,380**	**19**	**6,883,242**	**1**	**56,138**	**—**	**—**
New Jersey								
Allied Innovative Systems, LLC	1	375,169	1	375,169	—	—	—	—
DVX, LLC	1	165,044	1	165,044	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
FocalCool, LLC	1	440,605	1	440,605	—	—	—	—
Hackensack University Medical Center	1	367,420	1	367,420	—	—	—	—
Menssana Research, Inc.	1	993,490	1	993,490	—	—	—	—
Newark Beth Israel Medical Center	1	151,881	1	151,881	—	—	—	—
PharmaSeq, Inc.	1	999,802	1	999,802	—	—	—	—
Princeton Multimedia Technologies Corporation	1	1,010,884	1	1,010,884	—	—	—	—
Prolong Pharmaceuticals	2	267,639	1	166,300	—	—	1	101,339
Rutgers, The State University of New Jersey, New Brunswick	3	745,045	3	745,045	—	—	—	—
University of Medicine & Dentistry of New Jersey	26	10,320,661	22	9,850,251	3	205,184	1	265,226
Vasade BioSciences, Inc.	1	382,485	1	382,485	—	—	—	—
Total New Jersey	**40**	**16,220,125**	**35**	**15,648,376**	**3**	**205,184**	**2**	**366,565**
New Mexico								
Lovelace Biomedical and Environmental Research	4	3,210,603	3	1,789,579	—	—	1	1,421,024
Sandia National Laboratories	1	153,601	1	153,601	—	—	—	—
Southwest Sciences, Inc.	1	112,931	1	112,931	—	—	—	—
University of New Mexico	17	4,820,629	14	4,462,074	3	358,555	—	—
Veterans Administration Center	1	5,515,644	—	—	—	—	1	5,515,644
Total New Mexico	**24**	**13,813,408**	**19**	**6,518,185**	**3**	**358,555**	**2**	**6,936,668**
New York								
Aaron Diamond AIDS Research Center	1	619,952	1	619,952	—	—	—	—
Albany College of Pharmacy	1	292,039	1	292,039	—	—	—	—
Albany Medical College	4	905,603	3	885,328	1	20,275	—	—
Albert Einstein College of Medicine	3	4,858,746	—	—	—	—	3	4,858,746
Angion Biomedica Corp	4	1,782,765	4	1,782,765	—	—	—	—
City College of New York	3	1,281,382	3	1,281,382	—	—	—	—
Columbia University	88	49,512,852	78	46,259,835	8	1,757,430	2	1,495,587
Cornell University, Ithaca	6	2,467,028	6	2,467,028	—	—	—	—
CUNY Graduate School and University Center	1	328,970	1	328,970	—	—	—	—
CUNY, Herbert H. Lehman College	1	285,250	1	285,250	—	—	—	—
Feinstein Institute for Medical Research	3	1,114,942	3	1,114,942	—	—	—	—
Gene Network Sciences, Inc.	1	562,827	1	562,827	—	—	—	—
Glycotek, LLC	1	149,900	1	149,900	—	—	—	—
Hospital for Special Surgery	1	419,539	1	419,539	—	—	—	—
Jarvik Heart, Inc.	1	997,592	—	—	—	—	1	997,592
Masonic Medical Research Laboratory, Inc	1	414,829	1	414,829	—	—	—	—
Montefiore Medical Center, Bronx	2	644,077	2	644,077	—	—	—	—
Mount Sinai School of Medicine of New York University	22	11,552,438	21	11,090,271	1	462,167	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
New York Academy of Medicine	1	505,179	1	505,179	—	—	—	—
New York Academy of Sciences	1	20,000	1	20,000	—	—	—	—
New York Blood Center	3	1,022,980	3	1,022,980	—	—	—	—
New York Medical College	15	9,134,331	15	9,134,331	—	—	—	—
New York University School of Medicine	30	12,883,832	25	12,458,492	5	425,340	—	—
Ogilvy Public Relations Worldwide	3	2,449,129	—	—	—	—	3	2,449,129
Queens College	1	373,835	1	373,835	—	—	—	—
Regeneron Pharmaceuticals, Inc.	—	1,000,000	—	1,000,000	—	—	—	—
Rensselaer Polytechnic Institute	1	358,281	1	358,281	—	—	—	—
Rockefeller University	3	1,067,658	2	1,018,012	1	49,646	—	—
Roswell Park Cancer Institute Corp	2	863,590	2	863,590	—	—	—	—
Sloan-Kettering Institute for Cancer Research	6	1,577,870	6	1,577,870	—	—	—	—
St. John's University	1	245,250	1	245,250	—	—	—	—
St. Luke's-Roosevelt Institute for Health Sciences	2	1,018,548	2	1,018,548	—	—	—	—
State University of New York at Buffalo	19	6,538,772	18	6,149,741	—	—	1	389,031
State University of New York at Stony Brook	7	2,136,961	6	1,961,463	—	—	1	175,498
SUNY Downstate Medical Center	4	995,157	3	920,987	—	—	1	74,170
Syracuse University	1	568,311	1	568,311	—	—	—	—
Therasource, LLC	2	914,883	2	914,883	—	—	—	—
Transonic Systems Inc.	2	1,374,821	2	1,374,821	—	—	—	—
Trudeau Institute, Inc.	1	424,813	1	424,813	—	—	—	—
University of Rochester	49	20,620,937	44	19,294,228	5	1,326,709	—	—
Upstate Medical University	5	1,729,616	5	1,729,616	—	—	—	—
Visiting Nurse Service of New York	1	659,819	1	659,819	—	—	—	—
Weill Medical College of Cornell University	35	18,970,594	30	18,245,173	5	725,421	—	—
Winifred Masterson Burke Medical Research Institute	1	450,844	1	450,844	—	—	—	—
Yeshiva University	31	12,228,696	27	11,627,707	3	364,037	1	236,952
Total New York	**371**	**178,325,438**	**329**	**162,517,708**	**29**	**5,131,025**	**13**	**10,676,705**
North Carolina								
Affinergy, Inc	2	547,218	2	547,218	—	—	—	—
BioMarck Pharmaceuticals, Ltd.	1	1,000,000	1	1,000,000	—	—	—	—
Bioptigen, Inc.	1	367,072	1	367,072	—	—	—	—
BreathQuant Medical Systems, Inc.	1	352,450	1	352,450	—	—	—	—
Cirque Productions, LLC	1	133,130	1	133,130	—	—	—	—
Duke University	110	60,133,901	97	57,094,338	10	1,997,519	3	1,042,044
East Carolina University	2	637,458	1	581,206	1	56,252	—	—
Heart Imaging Technologies, LLC	1	578,261	1	578,261	—	—	—	—
North Carolina Central University	3	510,174	3	510,174	—	—	—	—
North Carolina State University	4	856,926	2	472,961	2	383,965	—	—
Precision BioSciences, Inc.	1	100,000	1	100,000	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Rho Federal Systems Division, Inc.	3	5,056,470	2	4,126,753	—	—	1	929,717
RTI International	1	1,856,536	—	—	—	—	1	1,856,536
The Hamner Institutes for Health Sciences	1	252,000	1	252,000	—	—	—	—
University of North Carolina at Chapel Hill	79	42,134,966	67	33,793,005	8	1,883,640	4	6,458,321
University of North Carolina at Charlotte	1	417,711	1	417,711	—	—	—	—
Wake Forest University	8	12,404,401	4	1,201,649	—	—	4	11,202,752
Wake Forest University Health Sciences	47	21,819,123	39	19,716,308	4	625,231	4	1,477,584
Williams LifeSkills, Inc.	1	428,641	1	428,641	—	—	—	—
Total North Carolina	**268**	**149,586,438**	**226**	**121,672,877**	**25**	**4,946,607**	**17**	**22,966,954**
North Dakota								
University of North Dakota	1	236,250	1	236,250	—	—	—	—
Total North Dakota	**1**	**236,250**	**1**	**236,250**	**—**	**—**	**—**	**—**
Ohio								
Arteriocyte, Inc.	1	281,794	1	281,794	—	—	—	—
Battelle Centers for Public Health Research & Evaluation	1	228,909	1	228,909	—	—	—	—
Case Western Reserve University	66	23,178,798	53	17,100,924	12	2,047,869	1	4,030,005
Children's Hospital Medical Center, Cincinnati	52	24,396,596	49	23,971,400	3	425,196	—	—
Cleveland Clinic	1	561,256	—	—	—	—	1	561,256
Cleveland Clinic Lerner College of Medicine of Case Western Reserve University	44	26,812,067	37	25,026,430	4	417,504	3	1,368,133
Cleveland Medical Devices, Inc.	1	237,546	1	237,546	—	—	—	—
Cleveland State University	2	296,832	1	265,865	1	30,967	—	—
ElectroSonics Medical Inc.	1	986,394	1	986,394	—	—	—	—
Great Lakes Pharmaceuticals, Inc.	1	100,000	1	100,000	—	—	—	—
Kent State University	2	919,521	2	919,521	—	—	—	—
MetroHealth Medical Center	2	372,910	1	320,012	1	52,898	—	—
Northeastern Ohio Universities College of Medicine	1	853,942	1	853,942	—	—	—	—
Nova-Ther Technologies	—	85,015	—	85,015	—	—	—	—
NovelMed Therapeutics Inc.	1	963,269	1	963,269	—	—	—	—
Ogilvy Public Relations Worldwide	1	561,877	—	—	—	—	1	561,877
Ohio State University	45	13,356,268	42	12,804,591	2	307,531	1	244,146
Ohio State University Research Foundation	1	1,939,338	—	—	—	—	1	1,939,338
Ohio University	1	353,499	1	353,499	—	—	—	—
Peritec Biosciences, Ltd	1	253,194	1	253,194	—	—	—	—
Research Institute at Nationwide Children's Hospital	5	1,209,400	4	1,179,636	1	29,764	—	—
Society for Heart and Vascular Metabolism	1	10,000	1	10,000	—	—	—	—
University of Akron	1	348,456	1	348,456	—	—	—	—
University of Cincinnati	37	15,900,610	34	15,203,410	2	521,179	1	176,021

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Toledo	2	432,000	2	432,000	—	—	—	—
University of Toledo Health Science Campus	3	2,849,605	3	2,849,605	—	—	—	—
Wright State University	5	1,418,514	4	1,305,976	1	112,538	—	—
Total Ohio	**279**	**118,907,610**	**243**	**106,081,388**	**27**	**3,945,446**	**9**	**8,880,776**
Oklahoma								
JK Autoimmunity, Inc.	1	110,001	1	110,001	—	—	—	—
Oklahoma Medical Research Foundation	3	2,316,270	3	2,316,270	—	—	—	—
Oklahoma State University, Stillwater	1	355,386	1	355,386	—	—	—	—
University of Oklahoma Health Sciences Center	12	5,890,615	11	5,828,979	1	61,636	—	—
University of Oklahoma, Norman	1	352,077	1	352,077	—	—	—	—
Total Oklahoma	**18**	**9,024,349**	**17**	**8,962,713**	**1**	**61,636**	**—**	**—**
Oregon								
C/J Media, Inc.	1	402,434	1	402,434	—	—	—	—
Oregon Health and Science University	31	13,220,198	28	12,497,602	3	722,596	—	—
Oregon Research Institute	2	1,204,897	2	1,204,897	—	—	—	—
Oregon State University	2	582,335	2	582,335	—	—	—	—
Portland State University	1	365,000	1	365,000	—	—	—	—
University of Oregon	1	313,900	1	313,900	—	—	—	—
Total Oregon	**38**	**16,088,764**	**35**	**15,366,168**	**3**	**722,596**	**—**	**—**
Pennsylvania								
Allegheny-Singer Research Institute	1	451,702	1	451,702	—	—	—	—
Blue Belt Technologies, Inc.	1	147,279	1	147,279	—	—	—	—
Carnegie-Mellon University	3	832,178	2	786,550	1	45,628	—	—
Children's Hospital of Philadelphia	35	17,613,135	32	16,503,539	2	683,304	1	426,292
Children's Hospital Pittsburgh/UPMC Health System	8	4,529,859	7	4,347,770	—	—	1	182,089
Drexel University	6	1,039,741	5	972,320	1	67,421	—	—
Ension, Inc.	2	1,864,565	1	691,547	—	—	1	1,173,018
Fox Chase Cancer Center	2	830,206	2	830,206	—	—	—	—
Industrial Science and Technology Network	1	715,015	1	715,015	—	—	—	—
Institute for Cancer Research	1	384,750	1	384,750	—	—	—	—
Magee-Women's Research Institute and Foundation	2	492,392	1	342,392	1	150,000	—	—
Molecular Targeting Technology, Inc.	1	823,967	1	823,967	—	—	—	—
NanoDynamics Life Sciences, Inc.	1	188,564	1	188,564	—	—	—	—
National Disease Research Interchange	—	135,000	—	135,000	—	—	—	—
Pennsylvania State University, Milton S. Hershey Medical Center	17	10,944,617	16	9,183,238	—	—	1	1,761,379
Pennsylvania State University-University Park	7	1,533,936	6	1,498,482	1	35,454	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Philadelphia College of Osteopathic Medicine	2	616,570	2	616,570	—	—	—	—
PinMed, Inc.	1	166,722	1	166,722	—	—	—	—
Salus University	1	341,645	1	341,645	—	—	—	—
Separation Design Group, LLC	1	396,200	1	396,200	—	—	—	—
Shifa Biomedical	2	515,311	2	515,311	—	—	—	—
Strategic Polymer Sciences, Inc.	1	98,714	1	98,714	—	—	—	—
Temple University	31	11,468,390	28	10,224,941	2	628,994	1	614,455
Thomas Jefferson University	23	10,067,786	23	10,067,786	—	—	—	—
Trustees of University of Pennsylvania	1	898,030	—	—	—	—	1	898,030
University of Pennsylvania	133	69,644,886	117	62,567,887	15	4,439,937	1	2,637,062
University of Pittsburgh	115	50,103,009	99	45,616,393	11	2,372,930	5	2,113,686
Wistar Institute	1	2,869,863	1	2,869,863	—	—	—	—
Total Pennsylvania	**400**	**189,714,032**	**354**	**171,484,353**	**34**	**8,423,668**	**12**	**9,806,011**
Rhode Island								
Brown University	6	2,158,845	5	2,112,019	1	46,826	—	—
Butler Hospital	1	476,166	1	476,166	—	—	—	—
EpiVax, Inc.	1	264,446	1	264,446	—	—	—	—
Gordon Research Conferences	11	127,500	11	127,500	—	—	—	—
Memorial Hospital of Rhode Island	1	147,252	—	—	—	—	1	147,252
Miriam Hospital	5	2,017,733	4	1,686,430	1	331,303	—	—
Myomics Inc.	1	98,136	1	98,136	—	—	—	—
QualityMetric, Inc.	1	970,848	1	970,848	—	—	—	—
Rhode Island Hospital	8	2,363,757	6	2,037,356	2	326,401	—	—
Women and Infants Hospital of Rhode Island	—	3,740	—	3,740	—	—	—	—
Total Rhode Island	**35**	**8,628,423**	**30**	**7,776,641**	**4**	**704,530**	**1**	**147,252**
South Carolina								
Clemson University	6	1,410,320	6	1,410,320	—	—	—	—
Medical University of South Carolina	35	13,086,370	29	8,672,450	4	829,041	2	3,584,879
University of South Carolina at Columbia	9	2,432,875	9	2,432,875	—	—	—	—
Total South Carolina	**50**	**16,929,565**	**44**	**12,515,645**	**4**	**829,041**	**2**	**3,584,879**
South Dakota								
Black Hills Center/American Indian Health	1	392,202	1	392,202	—	—	—	—
Missouri Breaks Research, Inc.	1	935,139	1	935,139	—	—	—	—
Sanford Research/University of South Dakota	2	253,271	1	201,993	1	51,278	—	—
University of South Dakota	1	357,814	1	357,814	—	—	—	—
Total South Dakota	**5**	**1,938,426**	**4**	**1,887,148**	**1**	**51,278**	**—**	**—**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Tennessee								
East Tennessee State University	5	1,438,186	5	1,438,186	—	—	—	—
Meharry Medical College	3	533,421	2	317,714	1	215,707	—	—
St. Jude Children's Research Hospital	9	8,474,378	8	8,017,759	—	—	1	456,619
University of Memphis	2	707,747	2	707,747	—	—	—	—
University of Tennessee Health Science Center	25	9,177,730	24	8,976,289	—	—	1	201,441
Vanderbilt University	96	40,469,186	83	37,819,510	12	2,254,229	1	395,447
Veterans Administration Center	1	2,881,731	—	—	—	—	1	2,881,731
Total Tennessee	**141**	**63,682,379**	**124**	**57,277,205**	**13**	**2,469,936**	**4**	**3,935,238**
Texas								
Baylor College of Medicine	65	23,461,233	52	20,549,299	11	2,012,841	2	899,093
Endothelix, Inc.	1	94,375	1	94,375	—	—	—	—
Kardia Therapeutics, Inc.	1	664,605	1	664,605	—	—	—	—
Lynntech, Inc.	2	725,607	2	725,607	—	—	—	—
Methodist Hospital Research Institute	3	1,320,117	3	1,320,117	—	—	—	—
Organizational Wellness & Learning Systems	1	408,396	1	408,396	—	—	—	—
Rice University	4	937,359	3	911,038	1	26,321	—	—
Rush University Medical Center	1	175,421	—	—	—	—	1	175,421
Scott and White Memorial Hospital	1	136,080	1	136,080	—	—	—	—
Southern Methodist University	1	405,897	1	405,897	—	—	—	—
Southwest Foundation for Biomedical Research	7	9,200,286	7	9,200,286	—	—	—	—
Texas A&M University System	15	3,716,870	15	3,716,870	—	—	—	—
Texas Engineering Experiment Station	3	966,561	3	966,561	—	—	—	—
Texas Heart Institute	2	1,089,750	2	1,089,750	—	—	—	—
Texas Southern University	1	381,013	1	381,013	—	—	—	—
Texas Tech University Health Sciences Center	1	91,235	1	91,235	—	—	—	—
University of Houston	3	883,082	3	883,082	—	—	—	—
University of North Texas	1	342,530	1	342,530	—	—	—	—
University of North Texas Health Science Center	1	153,101	1	153,101	—	—	—	—
University of Texas at Arlington	1	176,200	1	176,200	—	—	—	—
University of Texas at Austin	2	383,750	2	383,750	—	—	—	—
University of Texas at Dallas	2	681,485	2	681,485	—	—	—	—
University of Texas at San Antonio	1	11,327	—	—	1	11,327	—	—
University of Texas Health Center at Tyler	7	2,838,012	7	2,838,012	—	—	—	—
University of Texas Health Science Center at Houston	26	17,565,155	26	17,565,155	—	—	—	—
University of Texas Health Science Center at San Antonio	16	6,248,424	11	5,628,810	4	490,810	1	128,804

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Texas M.D. Anderson Cancer Center	6	1,672,903	6	1,672,903	—	—	—	—
University of Texas Medical Branch at Galveston	9	7,188,144	7	2,912,182	1	39,366	1	4,236,596
University of Texas Southwestern Medical Center	45	24,947,358	40	19,460,683	3	982,983	2	4,503,692
Total Texas	**229**	**106,866,276**	**201**	**93,359,022**	**21**	**3,563,648**	**7**	**9,943,606**
Utah								
Applied Medical Visualizations, LLC	1	336,719	1	336,719	—	—	—	—
Idaho Technology Inc.	1	147,105	1	147,105	—	—	—	—
LDS Hospital	1	45,044	—	—	—	—	1	45,044
Navigen, Inc.	1	147,660	1	147,660	—	—	—	—
University of Utah	44	14,556,656	39	13,439,826	4	657,537	1	459,293
Utah Artificial Heart Institute	1	1,241,500	1	1,241,500	—	—	—	—
Total Utah	**49**	**16,474,684**	**43**	**15,312,810**	**4**	**657,537**	**2**	**504,337**
Vermont								
Haematologic Technologies, Inc.	1	350,951	1	350,951	—	—	—	—
University of Vermont and State Agricultural College	44	18,082,884	39	16,527,909	4	1,282,018	1	272,957
Total Vermont	**45**	**18,433,835**	**40**	**16,878,860**	**4**	**1,282,018**	**1**	**272,957**
Virginia								
American Psychosomatic Society	1	10,000	1	10,000	—	—	—	—
CW Optics, Inc.	2	1,488,255	2	1,488,255	—	—	—	—
Eastern Virginia Medical School	1	305,648	1	305,648	—	—	—	—
ISA Associates, Inc.	1	391,703	1	391,703	—	—	—	—
Luna Innovations, Inc.	1	199,997	1	199,997	—	—	—	—
Mcguire Research Institute, Inc.	1	284,174	1	284,174	—	—	—	—
Molecules for Health, Inc.	1	154,128	1	154,128	—	—	—	—
Old Dominion University	1	377,839	1	377,839	—	—	—	—
SonoMedica, LLC	1	351,423	1	351,423	—	—	—	—
The Lewin Group	1	400,033	—	—	—	—	1	400,033
University of Virginia, Charlottesville	54	25,315,972	49	23,646,909	5	1,669,063	—	—
Virginia College of Osteopathic Medicine	1	221,145	1	221,145	—	—	—	—
Virginia Commonwealth University	18	5,713,666	16	5,456,460	2	257,206	—	—
Virginia Polytechnic Institute and State University	1	198,125	1	198,125	—	—	—	—
Total Virginia	**85**	**35,412,108**	**77**	**33,085,806**	**7**	**1,926,269**	**1**	**400,033**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Washington								
Asthma, Inc.	1	195,242	1	195,242	—	—	—	—
Axio Research, LLC	1	416,474	1	416,474	—	—	—	—
Barlow Scientific, Inc.	1	100,000	1	100,000	—	—	—	—
Battelle Pacific Northwest Laboratories	1	1,816,459	1	1,816,459	—	—	—	—
Benaroya Research Institute at Virginia Mason	1	634,375	1	634,375	—	—	—	—
CardioMetrix, Inc.	1	99,984	1	99,984	—	—	—	—
Children's Hospital and Regional Medical Center	11	4,891,537	11	4,891,537	—	—	—	—
Fred Hutchinson Cancer Research Center	28	20,899,176	22	12,829,137	1	31,490	5	8,038,549
Institute for Systems Biology	1	5,991,332	—	—	—	—	1	5,991,332
Northwest Research Associates, Inc.	1	164,882	1	164,882	—	—	—	—
Puget Sound Blood Center	3	2,563,192	3	2,563,192	—	—	—	—
Sunnybrook and Women's College Health Sciences Center	1	492,337	1	492,337	—	—	—	—
University of Washington	122	64,338,113	103	56,157,117	15	3,832,121	4	4,348,875
VPDiagnostics, Inc.	1	1,028,641	1	1,028,641	—	—	—	—
Washington State University	1	347,982	1	347,982	—	—	—	—
Total Washington	**175**	**103,979,726**	**149**	**81,737,359**	**16**	**3,863,611**	**10**	**18,378,756**
West Virginia								
Marshall University	2	506,863	2	506,863	—	—	—	—
West Virginia University	11	3,124,036	9	2,934,070	2	189,966	—	—
Total West Virginia	**13**	**3,630,899**	**11**	**3,440,933**	**2**	**189,966**	**—**	**—**
Wisconsin								
American Society of Gene Therapy	1	10,000	1	10,000	—	—	—	—
BloodCenter of Wisconsin, Inc.	5	3,720,035	4	3,550,851	1	169,184	—	—
Cellular Dynamics International, Inc.	1	249,898	1	249,898	—	—	—	—
Marquette University	1	249,696	1	249,696	—	—	—	—
Medical College of Wisconsin	57	36,895,640	51	31,529,277	4	477,809	2	4,888,554
Mirus Bio Corporation	1	155,085	1	155,085	—	—	—	—
Quantum Tubers Corporation	1	633,112	1	633,112	—	—	—	—
SeraCare Bioservices	1	211,095	—	—	—	—	1	211,095
Shared Medical Technology, Inc.	1	183,491	1	183,491	—	—	—	—
SpectroCon, LLC	1	738,446	1	738,446	—	—	—	—
University of Wisconsin-La Crosse	1	184,968	1	184,968	—	—	—	—
University of Wisconsin-Madison	59	23,316,827	50	21,361,883	8	1,764,934	1	190,010
University of Wisconsin-Milwaukee	1	367,864	1	367,864	—	—	—	—
Vascular Proflix, LLC	1	99,983	1	99,983	—	—	—	—
Total Wisconsin	**132**	**67,016,140**	**115**	**59,314,554**	**13**	**2,411,927**	**4**	**5,289,659**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Puerto Rico								
Universidad Central del Caribe	1	102,720	1	102,720	—	—	—	—
University of Puerto Rico Mayaguez	—	133,138	—	133,138	—	—	—	—
University of Puerto Rico Medical Sciences Campus	1	217,500	1	217,500	—	—	—	—
Total Puerto Rico	**2**	**453,358**	**2**	**453,358**	**—**	**—**	**—**	**—**
Total U.S.	**5,323**	**$2,553,041,955**	**4,635**	**$2,206,347,748**	**465**	**$94,947,275**	**223**	**$251,746,932**
Australia								
Baker Heart Research Institute	1	259,063	1	259,063	—	—	—	—
James Cook University of North Queensland	1	256,009	1	256,009	—	—	—	—
Walter and Elizabeth Hall Institute Medical Research	2	439,528	2	439,528	—	—	—	—
Total Australia	**4**	**954,600**	**4**	**954,600**	**—**	**—**	**—**	**—**
Canada								
Clinical Research Institute of Montreal	1	281,609	1	281,609	—	—	—	—
Hospital for Sick Children, Toronto	3	595,277	3	595,277	—	—	—	—
McGill University	1	127,018	1	127,018	—	—	—	—
McMaster University	1	578,610	1	578,610	—	—	—	—
Montreal Heart Institute	2	512,170	2	512,170	—	—	—	—
Ottawa Health Research Institute	1	140,871	1	140,871	—	—	—	—
St. Michael's Hospital	1	160,786	1	160,786	—	—	—	—
University Health Network	2	476,939	2	476,979	—	—	—	—
University of Alberta	1	131,085	1	131,085	—	—	—	—
University of British Columbia	1	256,009	1	256,009	—	—	—	—
University of Calgary	2	204,808	2	204,808	—	—	—	—
University of Montreal	1	345,939	1	345,939	—	—	—	—
University of Toronto	1	32,910	—	—	1	32,910	—	—
University of Western Ontario	1	206,986	1	206,986	—	—	—	—
Total Canada	**19**	**4,051,017**	**18**	**4,018,147**	**1**	**32,910**	**—**	**—**
Colombia								
Malaria Vaccine and Drug Testing Center	1	370,784	1	370,784	—	—	—	—
Total Colombia	**1**	**370,784**	**1**	**370,784**	**—**	**—**	**—**	**—**
France								
Paul Cezanne University Axi-Marseille III	1	76,680	1	76,680	—	—	—	—
Total France	**1**	**76,680**	**1**	**76,680**	**—**	**—**	**—**	**—**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Hungary								
Eötvös Loránd University	—	37,927	—	37,927	—	—	—	—
Institute of Enzymology, Biological Research Center	—	27,000	—	27,000	—	—	—	—
Total Hungary	**—**	**64,927**	**—**	**64,927**	**—**	**—**	**—**	**—**
Iceland								
deCODE Genetics, Inc.	1	614,517	1	614,517	—	—	—	—
Total Iceland	**1**	**614,517**	**1**	**614,517**	**—**	**—**	**—**	**—**
Netherlands								
Wageningen University	1	317,170	1	317,170	—	—	—	—
Total Netherlands	**1**	**317,170**	**1**	**317,170**	**—**	**—**	**—**	**—**
New Zealand								
Auckland Uniservices Limited	2	213,410	2	213,410	—	—	—	—
University of Auckland	1	464,956	1	464,956	—	—	—	—
Total New Zealand	**3**	**678,366**	**3**	**678,366**	**—**	**—**	**—**	**—**
Switzerland								
École Polytechnique Fédérale de Lausanne	1	270,000	1	270,000	—	—	—	—
Total Switzerland	**1**	**270,000**	**1**	**270,000**	**—**	**—**	**—**	**—**
United Kingdom								
Imperial College London	1	559,538	—	—	—	—	1	559,538
St. Mary's Hospital Newport	1	469,824	1	469,824	—	—	—	—
University of Bristol	1	503,283	1	503,283	—	—	—	—
University of Cambridge	1	262,170	1	262,170	—	—	—	—
Total United Kingdom	**4**	**1,794,815**	**3**	**1,235,277**	**—**	**—**	**1**	**559,538**
Total, Other	**35**	**$ 9,192,876**	**33**	**$ 8,600,468**	**1**	**$ 32,910**	**1**	**$ 559,538**
Grand Total	**5,358**	**$2,562,234,831**	**4,668**	**$2,214,948,176**	**466**	**$94,980,185**	**224**	**$252,306,470**

Appendixes

Types of Research Activity

Research Projects

Research Project Grants (R01): To support discrete and specific projects to be performed by one or several investigators in areas of the investigator's particular interests and competencies.

Research Projects (Cooperative Agreements) (U01): To support discrete, circumscribed projects in areas of an investigator's specific interest and competency involving substantial programmatic participation by the NHLBI during performance of the activity.

Research Program (Cooperative Agreement) (U10): To support a research program of multiple projects, requiring a broadly-based, multidisciplinary and often long-term approach, directed toward a specific major objective, common theme, or program goal relevant to the Institute's mission. The award involves substantial programmatic involvement by NHLBI staff to assist investigators during performance of the research activities.

Research Program Projects (P01): To support broadly based, multidisciplinary, often long-term research projects that have specific major objectives or basic themes directed toward a well-defined research program goal. Usually, a relatively large, organized group of researchers conducts individual subprojects, the results of which help achieve objectives of the program project.

Small Research Grants (R03): To provide limited support for extended analyses of research data generated by clinical trials, population research, and demonstration and education studies.

Academic Research Enhancement Awards (AREA) (R15): To support small-scale research projects conducted by faculty in primarily baccalaureate degree-granting domestic institutions. Awards are for up to $75,000 for direct costs (plus applicable indirect costs) for periods not to exceed 36 months.

Exploratory/Developmental Grants (R21): To encourage the development of new research activities in heart, lung, and blood diseases and sleep disorders program areas.

Exploratory/Developmental Grant (R33): To provide phase II support for innovative exploratory and developmental research activities initiated under the R21 mechanism.

Method To Extend Research in Time (MERIT) Award (R37): To provide long-term research grant support to investigators whose research competency and productivity are distinctly superior and thus are likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award; instead, they are selected by the NHLBI on the basis of their current grant applications and their present and past grant support.

NIH Director's Pioneer Award (DP1): To support individual scientists of exceptional creativity who propose pioneering approaches to major contemporary challenges in biomedical research.

NIH Director's New Innovator Award (DP2): To support exceptionally creative new investigators who propose highly innovative approaches that have the potential to produce an unusually high impact. The New Innovator Award will emphasize the importance and potential impact of the scientific problem, the novelty and innovativeness of the approach, and the applicant's potential for creative and innovative research.

Small Business Technology Transfer (STTR) Grants—Phase I (R41): To support cooperative R&D projects between small business concerns and research institutions, limited in time and amount, to establish the technical merit and feasibility of ideas that have potential for commercialization. Awards are made to small business concerns only.

Small Business Technology Transfer (STTR) Grants—Phase II (R42): To support in-depth development of cooperative R&D projects between

small business concerns and research institutions, limited in time and amount, whose feasibility has been established in phase I and that have potential for commercialization. Awards are made to small business concerns only.

Small Business Innovation Research (SBIR) Grants, Phase I (R43): To support projects, limited in time and amount, to establish the technical merit and feasibility of research and development ideas that may ultimately lead to commercial products or services.

Small Business Innovation Research (SBIR) Grants, Phase II (R44): To support research project ideas that have been shown to be feasible in phase I and that are likely to result in commercially marketable products or services.

Research Centers

Exploratory Grants (P20): To support planning for new programs, expansion or modification of existing resources, and feasibility studies to explore various approaches to the development of interdisciplinary programs that offer potential solutions to problems of special significance to the mission of the NHLBI.

Center Core Grants (P30): To support shared resources and facilities for basic, clinical, behavioral, and translational research in the prevention, detection, and treatment of HIV infection and AIDS.

Animal (Mammalian and Nonmammalian) Model and Animal and Material Resource Grant (P40): To develop and support animal models, or animal or biological materials resources. Nonmammalian resources include nonmammalian vertebrates, invertebrates, cell systems, and nonbiological systems.

Specialized Centers of Clinically Oriented Research (SCCOR) Grants (P50): To foster multidisciplinary research on clinically relevant questions enabling basic science findings to be applied more rapidly to clinical problems. Research focuses on clinical and basic scientific issues related to diseases and disorders that are relevant to the mission of the NHLBI. The SCCOR program places more emphasis on clinical research than the SCOR program and requires at least 50 percent of the funded projects to be clinical.

Comprehensive Specialized Research Center Grants (U54): To support a large, interrelated biomedical research program focused on a disorder within the Institute's mandate; to initiate and expand community education, screening, and counseling programs; and to educate medical and allied health professionals concerning problems of diagnosis and treatment of specific diseases such as sickle cell anemia.

Research Career Programs

Mentored Research Scientist Development Award for Minority Faculty (K01): To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

Mentored Scientist Development Award in Research Ethics (K01): To provide support for training in research ethics for health professionals working at academic and other health-related institutions in biomedical, behavioral, or public health research, particularly research involving human participants.

Minority Institution Faculty Mentored Research Scientist Development Award (K01): To support faculty members at minority institutions who have the interest and potential to conduct state-of-the-art research in cardiovascular, pulmonary, or hematologic disease or in sleep disorders.

Independent Scientist Award (K02): To enhance the research capability of promising individuals in the formative stages of their careers of independent research in the sciences related to heart, lung, and blood diseases; blood resources; and sleep disorders.

Research Career Development Award (K04): To foster the development of young scientists with outstanding research potential for careers of independent research in the sciences related to heart, lung, and blood diseases and blood resources. New grants are no longer awarded.

Research Career Award (K06): To assist institutions in supporting established investigators of high competency for the duration of their careers. New grants are no longer awarded.

Academic Award (K07): To support an individual with an academic appointment to introduce or improve a

disease curriculum that will enhance the academic or research environment of the applicant institution as well as further the individual's own career. This award series included the Systemic Pulmonary and Vascular Diseases Academic Awards, the Asthma Academic Award, the Tuberculosis Academic Award, the Sleep Academic Award, and the Nutrition Academic Award. Currently, the Cultural Competence and Health Disparities Academic Award and the Pediatric Transfusion Medicine Academic Award programs are being supported.

Clinical Investigator Development Award (K08): To provide an opportunity for clinically trained physicians to develop research skills and gain experience in advanced research methods and experimental approaches in basic and applied sciences relevant to cardiovascular, pulmonary, and hematological diseases.

Research Career Development Program in Vascular Medicine (K12): To promote comprehensive clinical research training for physicians wanting to specialize in vascular medicine. The goal is to prepare clinicians for academic roles in mentoring and leadership in clinical research in vascular medicine.

Research Career Development Program in Clinical Hematology (K12): To develop and evaluate multidisciplinary career development programs in clinical hematology research that will equip new academic researchers with the knowledge and skills to address complex problems in blood diseases, transfusion medicine, and cellular therapies.

Research Career Development Program in the Genetics and Genomics of Lung Diseases (K12): To develop multidisciplinary career development programs in genetics and genomics of lung diseases that will equip new investigators with the knowledge and skills to elucidate the etiology and pathogenesis of such diseases.

Minority School Faculty Development Award (K14): To develop faculty investigators at minority schools and enhance their research capabilities in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders. New grants are no longer awarded.

Research Development Award for Minority Faculty (K14): To encourage the development of minority faculty investigators and enhance their research capabilities in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders. New grants are no longer awarded.

Career Enhancement Award for Stem Cell Research (K18): To enable established investigators to acquire new research capabilities in the use of human or animal embryonic, adult, or cord blood stem cells. All candidates must have a sponsor, either within their own or at another institution, who is a well-qualified stem cell expert to serve as a mentor.

NHLBI Career Transition Award (K22): To support the postdoctoral research training of an outstanding individual in an NHLBI intramural laboratory for up to 3 years and subsequently, to support the individual's successful transition from postdoctoral research to an extramural environment as an independent researcher.

Mentored Patient-Oriented Research Career Development Award (K23): To provide support for career development to investigators who have made a commitment to focus their research endeavors on patient-oriented research.

Midcareer Investigator Award in Patient-Oriented Research (K24): To provide support for clinicians to allow them "protected time" to devote to patient-oriented research and to act as mentors for beginning clinical investigators.

Mentored Quantitative Research Career Development Award (K25): To provide support to investigators with quantitative science or engineering backgrounds who have made a commitment to focus their research on basic or clinical biomedicine, bioengineering, bioimaging, or behavioral sciences.

Clinical Research Curriculum Award (CRCA) (K30): To stimulate inclusion of high-quality, multidisciplinary didactic training in fundamental skills, methodology, theories, and conceptualization as part of the career development of clinical investigators.

Career Transition Award (K99/R00): To provide up to 5 years support in two phases to highly promising postdoctoral scientists to pursue research relevant to the Institute. The K99 phase consists of 1 to 2 years mentored support followed by up to 3 years of independent support (R00) contingent on securing an independent research position. Award recipients will be expected to

compete successfully for independent research grant support from the NIH or other Institutions during the independence phase to ensure continued support and a smooth transition to independence.

Other Research Grants

Scientific Evaluation (R09): To provide funds to the chairman of an initial review group for operation of the review group.

Cooperative Clinical Research (R10) (U10): To support studies and evaluations of relevant clinical problems. These grants usually involve collaborative efforts among several institutions and principal investigators and are conducted under a formal protocol.

Conference Grants (R13): To support national and international scientific meetings, conferences, or workshops at which research is discussed.

Research Demonstration and Education Projects (R18): To provide support designed to develop, test, and evaluate health-related activities and to foster application of existing knowledge to the control of heart, lung, and blood diseases and sleep disorders.

Resource-Related Research Projects (R24): To support research projects that will enhance the capability of resources to serve biomedical research in areas related to cardiovascular, lung, and blood health and diseases; blood resources; and sleep disorders.

Education Projects (R25): To provide support for the development and implementation of a program as it relates to a category in one or more of the areas of education, information, training, technical assistance, coordination, or evaluation.

Minority Biomedical Research Support Grants (S06): To strengthen the biomedical research and research training capability of minority institutions and to assist in increasing the involvement of minority faculty and students in biomedical research.

Pilot Project Award (SC2): To support underrepresentative minorities who are at the beginning stages of a research career and interested in testing a new idea or generating preliminary data, or who are more experienced investigators and interested in switching to a different field of research.

Continuing Education Training Grant (T15): To assist professional schools and other public and nonprofit institutions to establish, expand, or improve programs of continuing professional education, especially for programs dealing with new scientific developments.

Scientific Review and Evaluation (U09): To support an initial Scientific Review Group responsible for the assessment of scientific and technical merit of grant applications.

Resource-Related Research Projects (U24): To support research projects contributing to improvement of the capability of resources to serve biomedical research.

National Swine Research and Resource Center (U42): To support a National Swine Research and Resource Center that will serve as a resource for depositing, maintaining, preserving, and distributing swine models for studies of human diseases, as well as cryopreservation, storage, and reconstitution of embryos and germplasm.

Historical Black College and University Scientist Award (UH1): To strengthen and augment the human resources at historically black colleges and universities (HBCU) by recruiting an established research scientist into their biomedical or behavioral sciences department; to enhance the career of the recruited research scientist; and to strengthen other HBCU resources for the conduct of biomedical or behavioral research in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders.

Individual National Research Service Awards (NRSA)

Individual Predoctoral M.D./Ph.D. NRSA (F30): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; sleep disorders leading toward a combined M.D./Ph.D. degree. Training under this award is designed to provide a foundation for a career as a physician-scientist in the areas of interest to the NHLBI.

Predoctoral Individual NRSA (F31): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders leading toward the research degree (e.g., Ph.D.).

Postdoctoral Individual NRSA (F32): To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

NRSA for Senior Fellows (F33): To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

Institutional National Research Service Awards (NRSA)

Institutional NRSA (T32): To enable institutions to make awards to individuals selected by them for predoctoral and postdoctoral research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders.

Minority Institutional Research Training Program (T32M): To support full-time research training for investigative careers at minority schools in areas of cardiovascular, pulmonary, and hematologic diseases and sleep disorders. Graduate students, postdoctoral students, or health professions students may be supported under this program.

MARC Undergraduate NRSA Institutional Grants (T34): To support institutional training grants for underrepresented minority undergraduates to obtain research training and improve their preparation for graduate training in the biomedical and behavioral sciences.

NRSA Short-Term Research Training (T35 and T35M): To provide individuals with research training during off-quarters or summer periods to encourage research careers or to encourage research in areas of national need. This program includes the Short-Term Training for Minority Students Program and short-term training for students in health professional schools.

MARC Visiting Professors for Minority Institutions (T36): To increase the number of well-trained minority scientists in biomedical disciplines and to strengthen the research and teaching capabilities of minority institutions.

Other Support

Research and Development Contracts (N01): To develop or apply new knowledge or test, screen, or evaluate a product, material, device, or component for use by the scientific community.

Small Business Innovation Research (N43): To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas that may ultimately lead to a commercial product(s) or service(s).

NIH Inter-Agency Agreements (Y01): To provide a source of funds to another Federal Agency to acquire specific products, services, or studies.

NIH Intra-Agency Agreements (Y02): To provide a source of funds to another NIH component to acquire specific products, services, or studies.

Minority Research Supplements Programs: To provide supplemental funds to active NHLBI grants to support the research of minority high school, undergraduate, and graduate students; postdoctoral trainees; and investigators.

List of Abbreviations and Acronyms

ACCORD	Action To Control Cardiovascular Risk in Diabetes
ACE	angiotensin-converting enzyme
ACRN	Asthma Clinical Research Network
AIDS	acquired immunodeficiency syndrome
AMI	acute myocardial infarction
ARDS	acute respiratory distress syndrome
ARDSNet	Acute Respiratory Distress Syndrome Clinical Network
ARIC	Atherosclerosis Risk in Communities
ATP III	Adult Treatment Panel III
ATTRACT	Acute Venous Thrombosis: Thrombus Removal With Adjunct Catheter-Directed Thrombolysis
BABY HUG	Pediatric Hydroxyurea Phase III Clinical Trial
BARI 2D	Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics
BEE	Board of Extramural Experts
BRIDGE	Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Effective Invasive Procedure or Surgery
CABG	coronary artery bypass graft
CAMP–CS/ Phase II	Childhood Asthma Management Program–Continuation Study/Phase II
CARDIA	Coronary Artery Risk Development in Young Adults
CARE	Childhood Asthma Research and Education Network
CDC	Centers for Disease Control and Prevention
CF	cystic fibrosis
CHD	coronary heart disease
CHS	Cardiovascular Health Study
COPD	chronic obstructive pulmonary disease
CORAL	Cardiovascular Outcomes in Renal Atherosclerotic Lesions
CSCC	Comprehensive Sickle Cell Centers
CTOT	Clinical Trials in Organ Transplantation
CVD	cardiovascular diseases
DARD	Division for the Application of Research Discoveries
DASH	Dietary Approaches To Stop Hypertension
DBDR	Division of Blood Diseases and Resources
DCVD	Division of Cardiovascular Diseases
DERA	Division of Extramural Research Affairs
DIR	Division of Intramural Research
DLD	Division of Lung Diseases
DPPS	Division of Prevention and Population Sciences
FY	fiscal year

GENTAC	Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions
GOCADAN	Genetics of Coronary Artery Disease in Alaska Natives
GTRP	Gene Therapy Resource Program
HBCU	historically black college and university
HCHS	Hispanic Community Health Study
HEW	Department of Health, Education, and Welfare (now HHS)
HF-ACTION	Heart Failure: A Controlled Trial Investigation Outcomes of Exercise Training
HHS	Health and Human Services (formerly HEW)
HIV	human immunodeficiency virus
HTLV	human T-lymphotropic virus
ICD	International Classification of Diseases
IMMEDIATE	Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care
ISIS	Infant Study of Inhaled Saline in Cystic Fibrosis
JHS	Jackson Heart Study
JNC V	Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure
LOTT	Long-Term Oxygen Treatment Trial
MARC	Minority Access to Research Careers
MESA	Multi-Ethnic Study of Atherosclerosis
NAEPP	National Asthma Education and Prevention Program
NCEP	National Cholesterol Education Program
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NCSDR	National Center on Sleep Disorders Research
NHAAP	National Heart Attack Alert Program
NHANES	National Health and Nutrition Examination Survey
NHBPEP	National High Blood Pressure Education Program
NHI	National Heart Institute
NHLBAC	National Heart, Lung, and Blood Advisory Council
NHLBI	National Heart, Lung, and Blood Institute (formerly NHI and NHLI)
NHLI	National Heart and Lung Institute
NIA	National Institute on Aging
NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases
NICHD	National Institute of Child Health and Human Development
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIH	National Institutes of Health
NINDS	National Institute of Neurological Disorders and Stroke
NRSA	National Research Service Award
OAT	Occluded Artery Trial
ORTMH	Office of Research Training and Minority Health
OSA	obstructive sleep apnea

PA	Program Announcement
PAD	peripheral artery disease
PHS	Public Health Service
PIOPED	Prospective Investigation of Pulmonary Embolism Diagnosis
POUNDS LOST	Preventing Overweight Using Novel Dietary Strategies
POWER	Practice-Based Opportunity for Weight Reduction
PROGENI	Programs in Gene Environmental Interactions
REDS	Retrovirus Epidemiology Donor Study
RFA	Request for Applications
RFP	Request for Proposals
RPG	research project grant
SANDS	Stop Atherosclerosis in Native Diabetics Study
SBIR	Small Business Innovation Research
SCD	sickle cell disease
SCCOR	Specialized Center of Clinically Oriented Research
SCOR	Specialized Center of Research
SDB	sleep disordered breathing
SEP	Special Emphasis Panel
SES	socioeconomic status
SHARe	SNP Health Association Resource
STICH	Surgical Treatment for Ischemic Heart Failure
STTR	Small Business Technology Transfer
SWITCH	Stroke With Transfusions Changing to Hydroxyurea
TB	tuberculosis
TOPCAT	Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure
WHI	Women's Health Initiative
WHIMS	Women's Health Initiative Memory Study
WLM	Weight Loss Maintenance

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Discrimination Prohibited: Under provisions of applicable public laws enacted by Congress since 1964, no person in the United States shall, on the grounds of race, color, national origin, handicap, or age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity (or, on the basis of sex, with respect to any education program or activity) receiving Federal financial assistance. In addition, Executive Order 11141 prohibits discrimination on the basis of age by contractors and subcontractors in the performance of Federal contracts, and Executive Order 11246 states that no federally funded contractor may discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. Therefore, the Heart, Lung, and Blood Institute must be operated in compliance with these laws and Executive Orders.

U.S. Department of Health and Human Services
National Institutes of Health

National **Heart**
Lung and Blood Institute